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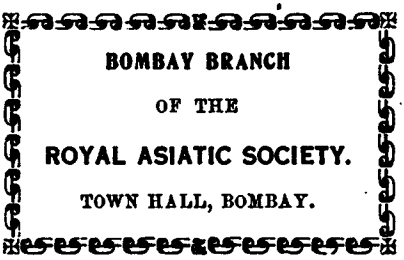

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ARCHEOLOGICAL STUDIES

AMONG THE ANCIENT

CITIES OF MEXICO

BY 82364

WILLIAM H. HOLMES,

Curator, Department of Anthropology.

PART I, MONUMENTS OF YUCATAN.

CHICAGO, U. S. A.

December, 1895.

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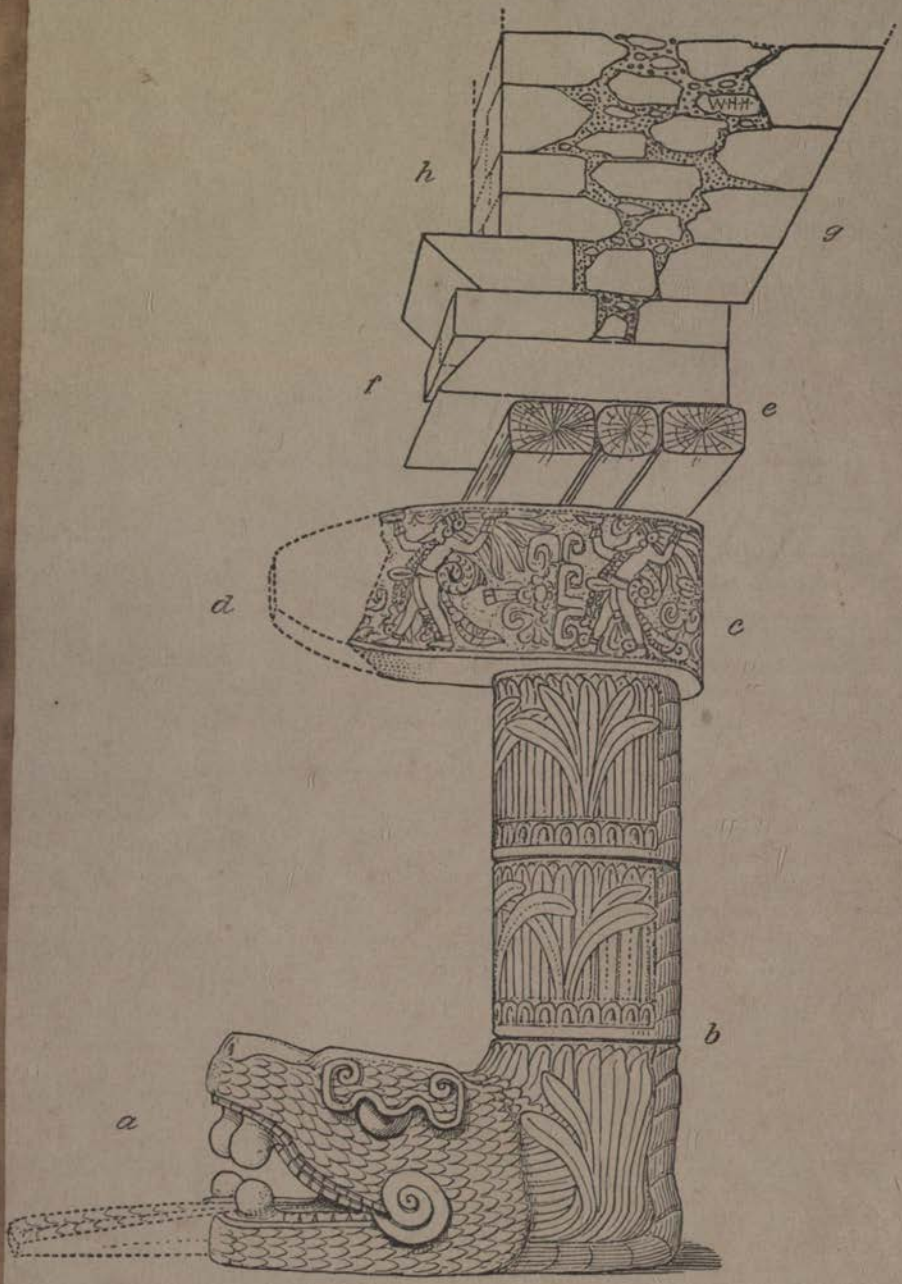

THE FEATHERED-SERPENT COLUMN OF CHICHEN-ITZA.

PL. I. THE FEATHERED-SERPENT COLUMN OF CHICHEN-ITZA.

Restoration made from mutilated examples.

Two of these columns are placed in each principal portal, facing outward. The end of the tongue extends forward on the narrow terrace nearly to the head of the stairway.

a. Base (head of serpent) resting on temple floor.

b. Shaft (body of serpent) with feather decoration.

c. Capital (tail of serpent) with atlantean figures in relief supporting the lintel.

d. Tail of serpent, broken off in principal examples, but probably tipped, originally, with sculptured rattles.

e. Three lintel timbers cut midway in their length.

f. Three-membered molding—archaic cornice—about midway in height of building.

g. Soffit or incline of arch of vestibule.

h. Decorated zone of entablature, 56 inches wide to upper moldings.

ARCHEOLOGICAL STUDIES

AMONG THE

ANCIENT CITIES OF MEXICO.

By William H. Holmes.

PART I.

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PREFACE.

In December, 1894, a number of gentlemen, representing different branches of scientific research, were invited by Mr. A. V. Armour to accompany him in his steam yacht Ituna on a voyage to Mexico. Three months were spent in that most interesting country, mainly in the states of Yucatan, Chiapas and Oaxaca. The writer was a member of the party and, as Curator of Anthropology in the Field Columbian Museum, was expected to examine and describe such archeologic remains as happened to be encountered during the journey. The following report, issued for convenience in two parts, is the result. Besides this a short paper treating of the geology, and particularly of the cenotes or natural wells of Yucatan, will appear in the Journal of Geology of the University of Chicago.

The author desires to express in this place his many obligations to his associates on the voyage for generous assistance, and especially to thank Mr. Armour and the President and Director of the Museum for the opportunity afforded of visiting this most important field of research.

The present paper is the first number of the Anthropological Series of the Museum Publications. It will be followed by a second number continuing the same subject and by a third treating of the Ceramic Art of Mexico. These, with possibly some additional matter relating to the same general region, will, it is expected, constitute the larger part, if not all, of the first volume of the series.

ITINERARY.

VOYAGE OF THE YACHT ITUNA.

The yacht Ituna sailed from New York, December 16th, 1894, bound for Havana and the Atlantic ports of Mexico. She was in charge of her owner, Mr. Allison V. Armour, who had with him as a guest Mr. Norman Williams of Chicago. At Jacksonville, Florida, the party was augmented by the arrival of Professor Allan Marquand of Princeton, Dr. Charles F. Millspaugh, Curator of Botany in the Field Columbian Museum, and Mr. William H. Holmes, Curator of Anthropology in the same institution. Christmas was spent in Havana, and on the 30th of December the yacht was anchored off the port of Progreso, Yucatan. At this place Mr. Edward H. Thompson, ex-U. S. Consul at Merida, and a well-known student of archeology, joined the party. With this port as a basis of operations, visits were made to numerous localities on the peninsula of Yucatan and in Mexico proper, three months of the winter season being devoted to the study of the Botany, Geology, Anthropology and Natural History of these most interesting regions.

The first voyage was toward the east, and visits were made to the islands of Contoy, Mugeres, Cancun and Cozumel and to the mainland of Yucatan, opposite these islands. This part of Yucatan has rarely been visited either by travelers or by students of the history and resources of the country. Both the islands and the mainland appear to be covered with dense forests, save for occasional low limestone bluffs and strips of sand along the beaches, and present a most monotonous appearance; but the region is rendered extremely interesting by its archeological remains, encountered at every turn, its peculiar geological formations, its almost unstudied botany and the marvelous transparency and iridescent beauty of its island-enclosed waters. Nearly two weeks were spent in cruising about from place to place, the Indian villages of Dolores, on Mugeres Island, and San Miguel, on Cozumel, being made the basis of operations. Before leaving these waters a run was made down the coast to secure a glimpse of the great ruin of Tuloom, now occupied by hostile Indians as an outpost. We were not permitted to land by our guest

and adviser, Don Jose Dolores Perez of San Miguel, and contented ourselves with a distant survey of the imposing walls of the principal ruin, which resembles a fortress crowning the high bluff facing the sea.

Returning to Progreso on the 12th of January, preparations were made for a month's excursion into the interior of Yucatan. From Merida visits were made to Tikul, Uxmal, Izamal and Chichen-Itza. The visit to Uxmal was all too brief for the examination of its splendid remains, but the spot is so fever-stricken even in winter that our most experienced advisers declared the risk too great to spend even a single night there. At Izamal several massive ruins, mostly pyramidal bases of ancient temples, rise in the midst of the modern town, breaking up its monotony and affording excellent foundations for its dwellings and churches. Here the party received most acceptable hospitality at the hands of Dr. George F. Gaumer, an American resident of the village. In Chichen-Itza, the most important group of ruins in Yucatan, a week was spent and careful studies were made, ample facilities being furnished by our associate, Mr. E. H. Thompson, proprietor of the fine hacienda on which the ruined city stands. On returning to Merida we were compelled to say farewell to Professor Marquand, who had to return to his duties at Princeton, and to Dr. Millspaugh, who was so disabled from an accident that he found it necessary to give up further field work. Mr. Williams had returned to the north from Havana.

Sailing again from Progreso on January 27th, the yacht was next anchored in the port of Laguna or Carmen, in the State of Campeche on the southern margin of the Gulf. Desiring to visit the famous ruined city of Palenque, situated sixty miles to the south in the State of Chiapas, we took a steamer that plies between Laguna and the middle Usumacinta river, and carrying along with us the Ituna's gasoline launch we arrived the next day at the entrance to the Rio Chiquito. Here the launch was brought into use, and passing down the latter stream and into the narrow canal-like branch called Catasaha we reached at night-fall the head of launch navigation. This day's journey was rendered memorable by the occurrence of several novel incidents. Animal life is exceedingly abundant in and along all of these winding streams, and increases as the sources are approached. Turtles, alligators, lizards, fish and birds were constantly in view. Vast numbers of cranes, herons, flamingos, cormorants, kingfishers, hawks and the like were assembled to prey upon the fish, which are very plentiful and so bold as to be troublesome to travelers by water. One variety of fish of large size, weighing in some cases as much as fifteen or twenty pounds, and called by the natives the "Sabalo," was addicted to jumping, and in the evening the water fairly boiled with

them. Their spring was so powerful and at such eccentric angles that it was dangerous to remain near the sides of the boat. Members of the party were struck with such great force that we were glad of the opportunity to tie up for the night before a group of squalid Indian huts. Taking a dugout canoe from this point, the Catasaha lagoon was entered in the early morning, and a landing was made on the muddy margin of the south shore. From this point the village of Las Playas was reached by a walk of three miles over green meadows which, during the wet season, are covered by the shallow waters of the lagoon. At this pleasantly situated village we were hospitably entertained by the leading citizen of the place, Don Carlos Diaz, who kindly secured the men and animals necessary for continuing our trip to the base of the mountains.

Following neglected roadways and obscure trails through dense tropical forests, and over a meadow region of great beauty from which the blue mountain ridge of Tumbala was always in view, a ride of thirty-five miles brought us to the romantic village of Santo Domingo del Palenque. On the following day a ride of eight miles to the southwest, through dense and magnificent forests and across low foot hills and fresh mountain streams, brought us to the base of the mountain slopes. Here we began at once to encounter ruined walls, roadways, bridges and temples, and after a rough, precipitous climb of half a mile up the side of the unique cascades of the Otolum we reached the great ruin called the Palace. In this place we encamped four days, making such examinations of the numerous remarkable ruins as the time would permit. On the 8th of February rain set in, and our ride back to the village was through one of the heaviest down-pours encountered in many years of travel.

Reaching the village of Catasaha it was found that the heavy rains had flooded the meadows and it was with much difficulty and by wading the deeper channels that we reached the border of the lagoon proper. Here our friend Don Carlos had provided a canoe, and by dark we were in our launch and threading our way down the crooked branches to the Usumacinta. With Mr. Armour at the helm we sailed all night, encountering numerous adventures both trying and amusing, and at daybreak reached the village of Palisada. Taking a cup of chocolate in the market place we were again on the way at sunrise, and passing down the Usumacinta and Palisada rivers and through the lagoon, we arrived safely on board the Ituna at Carmen, at five o'clock in the afternoon. As a storm was raging on the Gulf outside, it was decided to remain in port until it subsided, and during the stay of three days our party was most hospitably entertained by the American Vice-Consul, Mr. Herman Hahn. Receiving advices

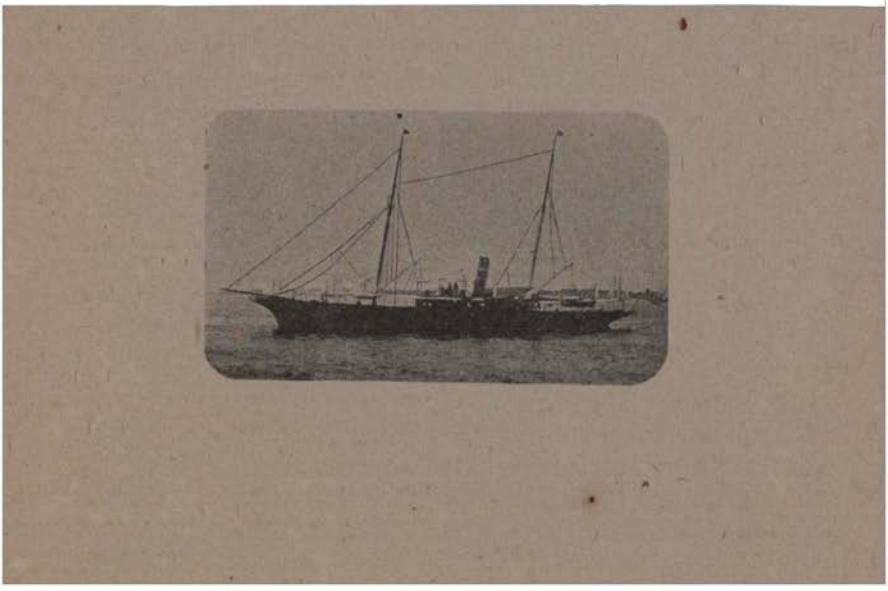
from the officers of the port that the storm was over and the passage of the bar possible, the Ituna sailed out over a charming sea, to encounter before midnight one of the severest "Northers" on record. It was the southern extension of the storm that gave New Orleans ten inches of snow. We were bound for Coatzacoalcos, the northern terminus of the Tehuantepec railway, a sail of about twelve hours from Carmen, but the little ship was tossed about for three days in a heavy sea, and at the end of that time, finding it impossible to enter the port on account of the heavy breakers across the bar, we steamed away for Vera Cruz. We approached that city in the early morning, witnessing the sun-rise glow on the great snow-capped cone of Orizaba. The pleasure afforded by this episode was rendered keen by its sharp contrast with the somber experiences of the voyage. The failure to get into the harbor of Coatzacoalcos was greatly regretted, as much pleasure and profit were anticipated from the proposed trip by the newly finished transcontinental railway to Tehuantepec, on the Pacific coast.

From Vera Cruz the party, consisting of Mr. Armour, Mr. Thompson and the writer, set out by way of Puebla to Oaxaca. On February 21st we passed through the two wonderful cañons threaded by the Mexican Southern Railway, observing the remarkable exposures of geological formations everywhere so complete that the geologic history of the region could be read as from an open book. At sunset the continental divide was reached, and a descent of two hours into the Oaxacan valley brought us to the metropolis of southern Mexico. The city of Oaxaca is unique and exceedingly interesting, the result of its exceptional isolation from the outer world previous to the completion of the railway two years ago. It is laid out in the midst of a broad, smooth, fertile valley, bordered and apparently completely surrounded by magnificent mountain ranges. Seen from the neighboring heights, with its out-lying villages set in fringes of green, bordered by far-reaching russet slopes which grade imperceptibly upward into blue mountains, it presents a sight never to be forgotten.

From Oaxaca two of the most noted ruin-groups of Mexico were reached. By stage twenty-nine miles to the southeast on the Tehuantepec highway we reached Mitla, a marvelous city now built over by a modern Indian village, and, with the exception of a half-dozen of its greatest temples, practically destroyed. Here a week was spent with exceptional profit, and a visit was made also to the ancient quarries on the mountain side and to a fortified hill near by. On the return to Oaxaca the writer visited Monte Alban, a few miles west of the city. It is a mountain ridge a thousand or more feet high, one mile long and less than a quarter of a mile wide, which has been remodeled by the hand

of man into terraces, plateaus and pyramids. As it stands today it is in its outlines an artificial mountain and an astounding monument to the energy and culture of the ancient races. At both Oaxaca and Mitla interesting collections were made of the art productions of the native people who still practice, with little modification, a number of their aboriginal arts.

From Oaxaca the party returned to the north, visiting Puebla and the City of Mexico. At the latter place examinations were made of the slight remaining traces of the ancient Tenochtitlan, consisting of a body of refuse over twenty feet in depth exposed in the excavations from which adobe is obtained for brick-making in the suburbs of the modern city. Later on an excursion was made to San Juan Teotihuacan, twenty-five miles north of Mexico, which is probably the greatest monument of ancient American enterprise and culture in existence. March 7th, the party, augmented in Mexico by the addition of Mr. Samuel C. Peck and his brother and Mr. Marshall Miller, returned to Vera Cruz and sailed first to Progreso to leave Mr. Thompson, who resides in Merida, and then crossed to New Orleans, where the writer left the party and returned to Chicago with such collections as had been made. Mr. Armour after a few days continued the journey by way of Havana, Nassau and Charleston to New York.



INTRODUCTION.

The present paper does not assume to be more than a sketch of limited portions of a great subject. It aims only to present the various ruined cities and archeologic sites visited as seen at a passing glance—a glance by far too brief for complete or satisfactory observation, but which, nevertheless, has given vivid and valuable impressions. The studies which shall cover this ground adequately and finally are yet to be made. Years of patient study, excavation, comparison and literary research are necessary to the elucidation of each great site. Many years must pass before exhaustive exploration is even attempted in more than a very few cases, for the Mexican government does not encourage its own people in this work and is loth to entrust it to others.* Owing to these conditions I regard it as the duty of those favored with even a glimpse of the crumbling remains to publish what they observe, though it be at the risk of some repetition. In this way the sum of information is augmented by small increments, and in time a large body of congruous data will be acquired, serving in a way the purposes that would be better subserved by systematic research. Most of the ruins examined on this voyage of exploration have been visited before, and some have been studied with considerable care by such students as Stephens, Charnay, Le Plongeon, Maudslay and Bandelier, as well as various early explorers, but the examinations in no case approach completeness, and even the surface phenomena are as yet but half explored. No attempt will be made here to review the literature of the subject as it is quite extensive, besides this very important work has been pretty thoroughly done by several writers and especially by Bancroft, who has compiled an extensive and valuable bibliography.

Panoramic Views, Etc. I had designed something considerably more ambitious in the way of panoramic views than it has been possible to present. Being unable to secure a skilled draughtsman, I was compelled to do the drawing myself, and haste and lack of skill in architectural work have left me with the merest sketches; these

*I do not mean by this observation to imply a criticism of the manner in which the Mexican government has treated this subject. It has probably done all it could in appointing custodians of important ruins and by forbidding the removal of relics from the country. Though our own government has expended money freely in the study of its primitive peoples and art, it has done less than Mexico in caring for its monumental remains and in preventing the removal of minor works of art to trans-Atlantic museums.

will, however, serve a good purpose in connection with the brief descriptions given in the text, as the reader will be able at once to locate each ruin and to comprehend its relations with the whole group. For detailed study it will be necessary to resort to photographs and to previously published illustrations. Owing to the rapidity with which the reconnaisance was made, many parts of the views are left somewhat indefinite, and occasionally parts are introduced from descriptions of others. A satisfactory panoramic view cannot be given until the artist has had the opportunity of examining all the monuments, great and small, in the minutest detail, thus making himself independent of mere isolated and much obscured views. The most careful drawing, representing merely what appears above the foliage and debris, would be of little avail. I have, therefore, in the case of the Yucatec cities, undertaken to represent the subjects as they would appear with the forests in a great measure removed. The cities are set in the midst of the great plain pretty much as if a fire had recently swept the country leaving the various buildings exposed. In many cases, also, where accumulations of debris obscure easily determined outlines and forms, I have ignored them, as, for example, around the base of the turret and the terraces of the Caracol in Chichen. On the whole, though imperfect in many respects, the views may be said to represent the ruins pretty nearly as they are to-day, though not exactly as they appear. Maps are in all cases placed in conjunction with the panoramas, so that it is only necessary to glance from one to the other to discover relative positions and dimensions, and to locate such descriptions and detailed studies as may be at hand. The maps are compiled from all available sources and make little pretensions to absolute accuracy. Where old maps were used I have corrected and added quite freely from my own observations. Though no systematic survey was made in any case, the compass and tape-line were constantly in use, and the maps of Palenque and Mitla, (Part II), are constructed wholly from my own notes. The maps and all other illustrations, save the photographs, were drawn by myself, and, I regret to say, exhibit many evidences of haste and lack of skill. Although there are at hand an unlimited number of photographs and sketches, I have inserted only such as seemed the most essential illustrations of what I have to say, and the future writer of monographic studies will still have an endless variety of unpublished subjects to draw upon.

The measurements of ruins and architectural features given are far from satisfactory. I found the measurements of those who had preceded me far from reliable, and I reached the conclusion that hurried and unverified observations must necessarily be wrong in

a large percentage of cases. My own figures as well as those of others are, therefore, as a rule, given as approximations only. A chief reason for the discrepancies in published measurements everywhere apparent is found in the fact that there is no exactness or uniformity in the datum points chosen. The bases of ruins are covered with debris and the tops have disappeared; horizontal measurements, even where margins are preserved, are affected by the fact that the parts of the wall or surface selected by two observers are not the same. A tape line carried around the base of a building may give a very different result from an equally careful measurement made a few feet higher on the wall. It may be said, however, that for all ordinary purposes of description and analysis, exactness, though desirable, is not absolutely essential, as nothing of importance depends upon inches.

The cities and sites visited by our party are scattered over a wide territory extending from Cape Catoche on the east to the Valley of Mexico on the west, and to Chiapas and Oaxaca on the south. They represent, if the historian and archeologist have properly correlated the data of their respective departments, at least three principal and distinct stocks of people—the Mayas, in the states of Yucatan and Chiapas, the Nahuas, in the Valley of Mexico, and the Zapotecas, in the State of Oaxaca. Part I of this paper deals almost exclusively with the Yucatec division of the first of these groups. A very brief review of the history of the province, its people and art will be useful in connection with this sketch of the ancient remains, as it will, I hope, enable readers not familiar with the general subject to secure a connected view of the whole field.

YUCATAN RISES FROM THE SEA AND IS PEOPLED. We are told by the early Greek historians that a broad continent, known as Atlantis, once spread out over what is now the middle Atlantic Ocean; that this land was inhabited by a vigorous and cultured race of people who carried their arms eastward to the farthest limits of the Mediterranean, and that the Greek gods, righteously angered by these encroachments, retaliated by sending Atlantis to the bottom of the sea. It has been a favorite theory with many students that the American races may have been derived from this source, inheriting therefrom the germs of that strange culture now represented by so many ruined cities. Whatever may be the truth with respect to the disappearance of the one continent it is a curious fact that another land has risen from its watery bed. We are able to clearly show by the aid of geology that a large part of the great block of terra firma now known as Yucatan is a new-born realm. The massive beds of limestone of which the peninsula is formed contain and are largely

made up of remains of the marine forms of life now flourishing along the shores. Fossil shells obtained from the rocks in various parts of the country are all of living species and represent late Pliocene or early Pleistocene times, thus possibly bringing the date of the elevation of Yucatan down somewhat near that of the reputed sinking of Atlantis, some eleven or twelve thousand years ago, or not far from the period that witnessed the oscillations attending the close of the glacial period.

Whatsoever the period of these events, it is observed that the elevation of the level bed of the sea resulted in the formation of a strangely featured land, and that its peculiar topographic and geologic conditions have left their mark on the people and their art. The strata of soft, porous limestones were more or less broken up by the strong throes of upheaval and acted like a sieve for the surface waters which, charged with vegetable acids, dissolved for themselves subterranean channels leading hither and thither into the sea. As a consequence we rarely find a spring or stream of running water on the surface of the land in central or northern Yucatan. Though soil has gradually formed on the rocky plains, and dense forests have overspread all, there is everywhere present, especially in the dry season, the suggestion of a waterless and forbidding desert.

But a strange thing has happened to fit this land for habitation. As time passed by the roofs of the underground streams were perforated in places by the processes of disintegration and caving in, and yawning sinks were formed, in the bottoms of which could be seen pools of darkling water. In the midst of the forest the traveler comes suddenly upon these great cistern-like pits leading down into the bowels of the earth. Many are irregular in outline and section, taking the character of caverns, but others are so round and even-walled as to be taken for works of art. They are often a hundred or more feet in depth and as much as 200 or 300 feet in diameter, and in some cases the water cannot be reached save by ropes or ladders, while in others portions of the walls have fallen in, giving steep pathways down to the water's edge. From these unique reservoirs the water supply of the ancient nations was almost exclusively obtained.

Into this strange new land, some thousand or more years ago, pioneers of the red race gradually found their way, and, taking possession of the great wells, built themselves habitations. The brittle limestone strata of the surface were broken into millions of blocks by weathering and the strong roots of the forest trees, furnishing natural quarries, and the dwellers about the lonely wells built themselves houses of stone. They prospered and multiplied, and being isolated and largely free from intrusions from without went on from century to century building and developing the stone-shaping arts, until each and

every great well or group of wells was encircled with temples and palaces grand in proportions and rich in unique though barbarous sculptures. Mystic wise men—culture heroes—appeared to instruct the people in the arts and in religion. Comparative peace prevailed for a long period and the various communities seemed welded together in a strong and lasting union. But the rapid development of many centres of culture and power seem to have led to jealousies and feuds and we learn from native sources that only a few decades before the coming of Columbus disastrous wars ensued, depopulating many districts and leaving the cities in ruins. The strong culture impetus was thus weakened and the contentions of numerous chieftains pitted against one another dissipated the elements of national strength. When, however, the Spaniard appeared on the coast, substantial union was effected and a bold defense was made, and there is little doubt that but for the gun and horse Spain could not in centuries have secured a permanent lodgment in the country.

The conditions under which the middle and southern branches of the family developed were different in many respects from those of the north, and as a result there were marked distinctions in the people and their culture; but when the disasters that signalized the close of Maya power came, all were alike involved, all losing in the main their status as nations and nearly all submitting to the yoke of the Christian priesthood.

THE MAYA RACE. At the period of conquest the Maya tribes, occupying the peninsula of Yucatan and considerable portions of neighboring territory to the south and west, are said to have comprised in the neighborhood of 2,000,000 souls. Today they are distributed over nearly the same area, but are reduced in numbers, it is estimated, to less than 500,000, half at least of whom continue to speak the Maya tongue in its purity. At the north where there has been much infusion of Spanish blood the race has been largely modified and an interesting and very homogeneous half-blood people has sprung up; but in the interior many of the tribes are of nearly pure blood and retain a strong spirit of independence. It is said that some bands have never been fully conquered and they practically substantiate the claim by holding the temples of their fathers by force of arms, defying all comers, whether white or red.

Physically the Mayas are short, sturdy and dark, possessing generally the typical characteristics of the red race. Their mental equipment is conceded to be of a high order as compared with other native stocks. Their origin is largely a matter of conjecture. One account* connects them with the history of the god and culture-hero Itzamna,

* Brinton, D. G., American Hero Myths, P. 145.

and derives an important element or division of the race from the east, where they are said to have come across—or rather through—the ocean, thus forcibly recalling the story of Atlantis. The more probable derivation is, however, from the west, as tradition, myth, art and geographical conditions point in this direction more decidedly than in any other. It appears that there are few ties of language with the Aztecs or other Mexican peoples though there are numerous and striking analogies in arts and customs, and it is not improbable that in the course of their history the Mayas have come into close contact with the great tribes of the Plateau of Mexico. Indeed, all may have had a common origin to the north in Mexico, or even beyond the Rio Grande.

In the culture scale this people stood at the head of the American tribes. They were still, properly speaking, barbarians, but in several respects seemed to be on the very threshold of civilization. Their status may be compared to that of the Greeks and Egyptians immediately preceding the dawn of history, and we may assume that they were, as measured by Aryan rates of progress, perhaps not more than a few thousand years behind the foremost nations of the world in the great procession of races from savagery toward enlightenment. It is certain that they were already employing a rude system of historic records and were the only nation on the western continent that had made any considerable headway in the development of a phonetic system of writing. Their hieroglyphics occupy a place, not yet well defined, somewhere along the course of progress from pictograph to letter, and are consequently difficult of interpretation. There is no doubt, however, that an age of literature was actually though slowly dawning in America when the shock of conquest came.

It becomes clearly apparent to the student that ethnic conditions were more simple in Yucatan than in the great southern and western centres of culture. There was but one race; the land was not a thoroughfare for races, and the physical conditions were unique in their uniformity. We find here greater homogeneity in the monumental remains and, indeed, in all branches of art. There is, further, a strong probability that the permanent settlement of the country, or at least the introduction of higher phases of culture, took place at a comparatively recent date.

Today the chief reminder of the great past of the Mayas is the crumbling remains of their architecture, but remarkable advance had been made in several other arts not embodied in such durable materials. They made paper of maguey, and their books, several of which have been preserved and are now in the libraries of Europe, show advanced skill in pictographic and glyphic writing, and a fertility of imagination hardly paralleled among the known primitive races of the world.

Their calendar system was highly developed and appeared to have embodied in it so many elements of accurate chronology that European scholars were amazed. Alexander von Humboldt was so deeply impressed with its intricacy and perfection that he claimed it could not be wholly of native development, believing that certain elements had been borrowed from the far east; today, however, Brinton and others are of the opinion that it is pretty certainly the outgrowth of peculiarly American thought and practices. Its chief office appears to have been to serve the priesthood in carrying on their complex system of religious observances, sorcery and divination.

Their language is highly developed, though the speech is guttural, and its grammatical construction is said to resemble the English more closely than does that of any other American tongue. Their religion was more humane than that of the Aztecs, human sacrifice having been much less generally prevalent. The priesthood was no doubt intelligent and all-powerful. Their sociology and government showed modifications of the ordinary American systems.

They practiced agriculture with success, depending but little on the chase, and were inclined to peace rather than war. They seem to have had considerable commercial spirit and navigated the seas, trading with Cuba and other distant parts, possibly including even Florida. There are decided traces of Yucatec characters in the ceramic art of the Gulf coast of at least three of the states. In the various shaping arts they had few competitors in America, working with especial success in stone, wood and clay. Yucatan, formed of the younger sedimentary rocks, was without native metals. Copper, silver and gold were obtained from distant parts in small quantities and had but little place in the arts. The textile and ceramic arts were practiced with especial success, certain varieties of earthenware obtained from the southern Maya areas ranking among the highest work of its class in America.

MONUMENTAL REMAINS. Maya architecture, with its associated sculpture and painting, constitute the best remaining index of the achievements of the race. The 70,000 square miles of Maya territory are so dotted with the ruins of towns and cities that the traveler is seldom out of sight of some mound, pyramid or other massive structure. The preservation of these remains is wonderful, considering the four hundred years of decay and destruction through which they have passed. There is hardly a modern village or town on the peninsula of Yucatan that is not built in some part of materials derived from the ancient structures. Yet the work of demolition still goes on, and presently, unless the Mexican Government takes adequate measures to preserve them, the traces of a conquered race and its strange art will

exist only in books. Nature has vied with man in the work of leveling the noble monuments with the ground. The luxuriant vegetation which envelops the ruins sends a multitude of strong roots deep into the masonry at every vulnerable point; growing rapidly, they act like wedges, separating masses and aiding gravitation and the elements in their never-ceasing efforts at destruction.

FUNCTION OF BUILDINGS. The question as to the function of the many buildings now found in various stages of demolition in the Maya province has been raised again and again and still remains somewhat imperfectly answered. There is no doubt, however, that in the main they were devoted to the uses of religion. This is clear from numerous statements made by the conquerors, who were frequent witnesses of the strange rites practiced more or less publicly in similar buildings in all parts of the country. Further than this it is observed of many nations in various parts of the world that their most important buildings were devoted to the gods and the priesthood, and the American races, being intensely religious and profoundly moved by mystic ideas, would hardly afford an exception to the rule. Again many of the buildings are of such peculiar or specialized plan that we are warranted in assigning them definitely to religious uses; such are the so-called temples and shrines occurring in almost every group of ruins. They are unfitted for the ordinary purposes of dwelling, assembly or defense; they are restricted in space, are built on pyramids or terraces reached by steep stairways, and have a solidity of construction and an overloading of mythological embellishment not demanded by and hardly consistent with ordinary secular uses. There are other buildings, often of colossal size, and having many windowless rooms, which may have been occupied by religious societies or by functionaries whose duties pertained to the enclosed courts or to adjoining temples. Still they could as well have served ordinary domestic purposes, since life in these tropical regions must have been lived largely in the open air and the cavern-like chambers would serve as cool retreats in the summer and remain snug and dry in the prolonged wet season. Other structures still are wholly unique; one class, believed to have been gymnasiums or ball-courts, consists mainly of two parallel walls of great height and enormous thicknesses, and another are turret-like buildings to which no particular use can with reason be assigned. Possibly rites pertaining to the dead may have been extensively practiced in these buildings, but purely mortuary structures, if such exist, are not well identified. Tombs of simple construction are found in various relations with the ruined monuments, occurring not infrequently as vaults or small chambers in the sides of pyramids and terraces. Burials in what ap-

pear to be ordinary earthen mounds have been reported and some examinations have been made, but it must be admitted that as yet the methods of disposing of the dead by the Yucatecs are imperfectly understood.

The houses of the people were no doubt largely built of wood and thatch, or of these materials in combination with rubble, so that they have for the most part disappeared. They are doubtless well represented by the more primitive dwellings of the modern Mayas.

We find little evidence of the existence of a defensive motive among the builders, and on the whole the Mayas must, during the period of greatest prosperity, have been a peaceable people. There is little or no indication of the selection of particularly defensible sites and few walls have been found that resemble fortifications. The grouping of buildings in general plan has no suggestion of a defensive arrangement, and the occasional assemblage of four strong structures about a court, though presenting somewhat the appearance of a fortress, has apparently no significance in this connection; the buildings are in many cases placed so far apart at the corners as to give free access to all comers, and the doorways to apartments are occasionally in the outer walls. Then again the doorways bear no evidence of having had doors of a nature to aid in defense. There are a few examples of entrances whose peculiar construction cannot be explained save on the theory that they were intended to make access difficult. This may not indicate a defensive purpose but rather the intention to remove the chambers as far as possible from public intrusion. The great thickness of walls and the extraordinary massiveness of construction had no reference to defense, but resulted from the crude efforts of aspiring builders to secure the strength and permanence that greater experience would have secured by less costly means.

THE ARCHITECT AND HIS PLAN. Some of the buildings are composite and show successive accretions or periods of growth, and this is true to a large extent of the greater buildings of most nations, but there are others that stand as perfect units of design, in which the conception must have been complete in every detail when the construction began, a master mind controlling the cutting and the placing of every stone. There may have been working drawings—and the people were certainly equal to the task of making them—but if there were none, the carrying out of the work without them must be regarded as even more remarkable. The construction of such buildings as the Palace at Uxmal and the Castillo at Chichen indicate a mastery in architectural design well calculated to astonish the student of the half-crystallized culture of the American races in general.

There can be little doubt that when the work of building began in such cases, the ground plan, elevation and constructive design were fully worked out and the spacings of doorways, moldings and panels and all details of sculptured decoration were fully decided upon; and I should say that even details of stone cutting, the number, width and angle of courses of masonry, were predetermined, as otherwise, with the complexity of form and the infinity of geometric detail characterizing the façades, utter confusion must have resulted.

INSTRUMENTS OF PRECISION. As to the implements and devices used for securing precision of dimension, line, surface and angle, opinions differ. There was, no doubt, a vast deal of simple eye work—and what people have native powers in this direction superior to the Americans?—but whether a definite unit of measurement had been devised, or whether the square and plummet as known to civilized builders were employed, it is certain that competent devices were in use, since the carrying up of the varied walls of structures hundreds of feet in length and width and many feet in height, with constantly varying relations of parts and play of angles and slopes, without accurate appliances, without something better than the "mere rule of thumb," would have required superhuman powers on the part of the builders.

ORIENTATION AND ASSEMBLAGE. Notwithstanding the suggestion of mastery in the art of designing and building, there is much lack of unity in the general plan and grouping of the structures. Though there is usually a suggestion of recognition of the points of the compass in placing the buildings, very few are accurately oriented, and there is such diversity of variation that we must conclude there was no particular demand for uniformity, a conclusion rather at variance with the accepted notion which gives regard for the points of the compass a high place in native concepts. In other parts of Mexico, as in the Valley of Mexico and Oaxaca, orientation was attended to with much greater care.

As to the existence of anything like a system of streets or roadways little can be learned from the ruins themselves. Usually the association of separate buildings appears to be merely that of convenient proximity. Perhaps the most usual form of assemblage is that of apartments or buildings on or about a terrace or pyramid, the cluster suggesting the cell groupings of some insects. The only approach to system in the grouping of the structures of the Yucatec cities is seen in the assemblage of four buildings about a court. This arrangement prevails extensively in the Zapotecan and Nahuatl cities of Mexico proper. The members of the quadrangles are, I believe, sometimes joined at the inner corners or perhaps connected completely all around,

but more frequently they are separated, giving free access to the court. In a few cases there are compound clusters of buildings embodying two or more courts, as in the Palace at Palenque.

BUILDING MATERIALS. The nature of the materials at the disposal of a people inclined to building exerts a profound influence upon the results achieved. Stone of somewhat decidedly favorable qualities would seem almost essential to greatness in the art of architecture. The Mayas were especially favored in this respect. The peninsula of Yucatan is composed of massive beds of limestone, homogeneous in texture and easily cut, even with primitive tools. Nature had not only supplied the stone, but it had in some measure prepared it for building. Although the land is approximately a plain, it is still in a small way broken up by low ridges and steps, and by sinkage into underground channels. The forests, growing densely everywhere, have broken up the surface beds, giving great quantities of loose stones immediately available to the builder and directing the way to the opening and working of quarries. The presence of unlimited supplies of limestone together with timber made the burning of lime an easy task and this product was extensively employed. The Yucatec stone mason had, therefore, every necessary building material at hand, although he still lacked, in a great measure, materials suited to the manufacture of quarrying and cutting tools. Cherty seams or masses of indurated limestone, occurring in many parts, served for the ruder tools, and picks and chisels of special hardness were probably brought in from a distance. Copper chisels are occasionally found as far east even as Cozumel, but if used at all in the dressing of stone they must have taken an unimportant place in the work on account of the rarity of the material. I had no time to seek the quarries from which stone was obtained in Yucatan, but had the good fortune to come upon excellent examples in Oaxaca. Careful descriptions of these will be given in Part II of this paper.

Mortar, made of lime and sand, and cement-like mixtures composed of mortar tempered with gravel, pounded stone, etc., were extensively used, and their durability is remarkable. Numerous floors and roofs are still preserved, and many fine examples of stucco modeling have withstood the destructive effects of the weather for four hundred years or more.

The builders made very considerable use of wood, which, considering the inferior grade of tools available, was cut, hewn and carved with much skill. Wood must have been extensively used in connection with the great stone buildings, as in doorways, in closing spaces between structures now disconnected and in various enclosures and barriers. There is no doubt that pliable vegetal growths,

such as poles, bark, vines, twigs, etc., used in textile or semi-textile combinations, were very fully employed in ordinary domestic structures as well as in less pretentious buildings of other classes pretty much as they are to-day.

TRANSPORTATION. The gathering of stones and the cutting out of masses from the living rock were followed by transportation, a most tedious and laborious task for a people without beasts of burden and probably without many of the effective transporting devices known to more advanced peoples. The work of carrying the earth, mortar and stones used in hearting the pyramid of the Castillo at Chichen or the triple-terraced pyramid of the Palace at Uxmal was of itself a great undertaking, but the transportation of the countless stones for the facing of both pyramid and superstructure and the lifting of the larger masses employed in columns, jambs, pillars and the like to heights reaching in cases nearly one hundred feet, required strong hearts and hands and a controlling power of exceptional vigor and permanence. The Yucatec Mayas did not, however, undertake to employ stones of enormous size, as did the ancient builders of Mexico and Peru. No block or mass was observed estimated to weigh more than six or eight tons.

STONE CUTTING AND SCULPTURE. In constructing the greater buildings of Yucatan, vast quantities of stone were required, and the labor of dressing and carving it must have been exceedingly great. This would be true if nothing but the plain squared and faced stones were considered, but when we behold the broad sculptured façades of such buildings as the Governor's Palace at Uxmal or the Casas at Kabah, our minds are filled with wonder. Words fail to give a clear notion of the work, for what definite conception is conveyed when it is stated that in a single continuous façade upward of twenty thousand stones were used, not only hewn of varied special shapes, but each sculptured to represent some individual part of a face, figure or geometric design, and all fitted together with such skill as to give the effect of an unbroken whole? Maya statuary, if such their most ambitious sculpturings may be called, is, of course, conventional, and from our point of view, extremely crude, but these works were almost exclusively intended to be employed in architectural embellishment and were all-sufficient for the purpose. Such are the figures and groups of figures sculptured in high relief or in the round and set in niches in the walls, or fixed by means of tenons in various parts of the field of decoration. There seem to be, in the north, no figures corresponding to the remarkable monolithic carvings of the southern Mayas in Guatemala and Honduras. Such works as the recumbent human figures or Chac-Mools, the tigers and Atlantean figures of

Chichen are not of a high order of art and were probably mostly, if not exclusively, mere adjuncts of building or furnishing rather than independent or individual works of sculpture.

MASONRY, STUCCO WORK AND PAINTING. The masonry comprises, in general, hearting and facing. The former consists of earth, mortar and stones variously combined and usually forming strong, well-compacted bodies. The latter consists of stone cut or uncut and laid up, with few exceptions, in excellent mortar. Where the stones were accurately cut, little mortar appears in the face of the wall, but it was freely used in the hearting, and when the facing stones were deep they were dressed somewhat smaller behind, and set back in the mortar as a tooth in its socket. In the facing of many walls, however, the stones were very shallow—often mere tile-like slabs—and had but slight hold upon the body of the hearting.

In those centres of building operations where the limestone was readily worked and of fine, even texture, the facing is well cut, and the wall surfaces are in general so even and true as to stand the test of the square and plumb line; but in localities where the stone is uneven in texture and quite hard, or in provincial sections where building was not carried to a high degree of perfection, the facing is rarely well dressed, save about the doorways, arches, corners and especially exposed parts. Rough surfaces were very generally evened up with plaster.

A remarkable feature of these structures is the great thickness of the walls, and especially the extraordinary massiveness of the masonry above the spring of the arches. This is clearly shown in several of the sections inserted in the following pages. Where, for example, the outer wall is three feet thick and the arch within is ten feet wide, the mass of masonry thickens upward from three feet at the base of the arch to eight feet at the ceiling level, and in an inner wall, widening both ways, to thirteen feet, so that two-thirds or more of the space included in the upper half of the structure is solid masonry. The roof is often very thick, thus greatly increasing the bulk, and it seems a marvel that collapse from mere weight has not been more frequent than seems to have been the case. To all this bulk was added, in many instances, massive false fronts or colossal roof-combs laden with ornament. So strongly knit is the masonry, however, that but for the decay of wooden lintels, most of the great façades now in ruins would have been very fully preserved. I have computed that a single-chamber structure, with walls of usual thickness and with average arch space and roof mass, would have two-thirds of its bulk solid masonry, which looks like a lavish waste of space, material and labor. If we take the measurements of the Governor's Palace at

Uxmal, given by Bancroft, we find by a rough computation that the structure occupies some 325,000 cubic feet of space, upwards of 200,000 of which is solid masonry, while only about 110,000 feet is chamber space. If the sub-structure be taken into account, the mass of masonry is to the chamber space approximately as 40 to 1.

Notwithstanding the success of these Maya masons in erecting buildings capable of standing for hundreds of years, they were yet ignorant of some of the most essential principles of stone construction, and are thus to be regarded as hardly more than novices in the art. They made use of various minor expedients, as any clever nation of builders would, but depended largely on mortar and inertia to hold their buildings together.

One of the most elemental essentials of good work is the systematic breaking of joints in laying one course of stones over another. This idea had hardly been grasped, as it not infrequently happens that a seam or succession of joints is connected almost directly from base to summit of a wall, and at corners, within and without, and about doorways the stones are not bonded at all and are free to fall out as soon as the mortar gives way. The only possible explanation of this condition of the work that occurs to me is that the habit of treating the stones of a wall as so many elements of a mosaic pattern has tended to retard progress in the direction of what is sometimes called scientific construction. It will readily be seen that in carving and laying the stones of a geometric design, as a line of fret-work or of snouted masks, it would be extremely inconvenient to adapt the shapes to any system of jointage, and indeed such a thing would be out of the question.

Another considerable element of weakness in many of these structures was the employment of veneered facing over large surfaces without sufficient headers or long transverse bonding stones. The tendency to break away, even with very thin stones, is in a measure counteracted by giving the back a bevel almost from the face, thus allowing the mortar to come well forward in strong tongues nearly to the surface. In some cases the facing has fallen in a body from considerable areas, exposing the hearting, which presents a remarkably even surface as if built first as a rough wall to be faced up afterward at the convenience of quarrymen and stone-cutters.

The laying of plaster or concrete floors and roofs was an important feature of the mason's work, and the areas covered were often very large. Stucco, a term applied to plaster when used in modeling, was extensively employed in decoration and required special skill in its manipulation. This work was probably executed by the sculptor or by professional modelers. It was adapted to all

classes of work and especially to graphic or non-geometric embellishment, and found its greatest field perhaps in the elaboration of colossal faces and figures such as may be seen at Izamal, Nocuchich and Palenque. At Palenque, important wall spaces, roof slopes and expansive roof combs are loaded with ambitious mythological subjects. Where the relief was bold, stones of suitable length and size were set into the masonry to support the plaster. Thin slabs of limestone were sawed into strips and cemented together very skillfully to form the skeleton of the figures. Upon this foundation the plaster was modeled, finished, polished and painted. In some cases glyphs and parts of figures and ornaments were first separately modeled and then set into place in the backing of fresh mortar. It is observed that in some cities stucco embellishment prevailed, while in others sculpture held almost undisputed sway. It is not known whether this difference is to be attributed to distinctions in the people, to difference of period or to the influences of peculiar local environment.

It was the practice to finish plain walls in plaster, often rather roughly applied, and nearly all surfaces, exterior and interior, where effect was of consequence, were finished in color. Very often plain surfaces in corridors and important apartments were embellished with graphic subjects, ornamental designs, devices and glyphs in brilliant colors. Sculptures in the round and in all degrees of relief were also colored with great care and elaboration. The range of colors is wide, including black, white and various shades of green, blue, red and yellow. Their composition has not been made a matter of study, but they probably include both mineral and vegetal substances.

As to the methods of manipulating stone, mortar and color, little is definitely known, save through a study of the actual remains. Unlike the Egyptians, who pictured almost everything relating to their own arts and avocations, the Mayas give us but few hints of these things, both graphic and plastic art dealing almost exclusively with sacerdotal subjects which furnish, incidentally only, hints of practical things. A notable exception is found in one of the Bodleian codexes, where various domestic episodes and illustrations of the practice of ordinary arts are given. Stone, when required in large bodies, was cut out of the mass, probably with rude stone picks, and flaked and pecked into shape at great expense of labor. Very generally the dressed surfaces show the chisel and pick or hammer marks, as indicated in the specimen illustrated in Pl. II. It will strike the observer as remarkable that the tool marks in this case retain the whiteness of the original bruise so distinctly as to be photographed,

but this effect is deceptive; the roughened surface of the bruise merely retains the white particles of the mortar or paint which have disappeared from the smoother fractured surfaces. Attention may be called to the markings near the upper margin of the stone; the blows employed in flaking off the upper surface and straightening the corner have been made with a sharp straight-edged tool, such apparently as are known only in metal. A little below the edge is a second line of these marks, indicating that the workman had contemplated and then abandoned a further reduction of the width of the stone.

I am not able to say with certainty to what extent the dressed surfaces of the stone in the walls of the buildings were ground or polished, but it seems natural that abrading processes should have been generally employed. Hammer stones, sledge-heads, picks and chisels of hard stone are found, but not in the great numbers that might be expected. They are not superior in make to like tools employed by the average American savage, and none of them seem capable of having made the marks illustrated in the figure. We are thus led again and again to wonder whether it is not possible that metal tools were used and that traces of their existence, save in the sculptures produced, are wholly obliterated by time.

The lime-burner and the color-man were most important auxiliaries of the Maya builder. Mortar was used in enormous quantities and manipulated with great skill, and the same may be said of color; and the trowels and brushes employed were no doubt such as primitive people usually devise. It should be observed that it was a common practice all over the Mayan, Oaxacan and Nahuatl territories to finish architectural ornaments, statuary and glyphs, where the stone was not of the finest quality and susceptible of high polish, in thick enamel-like coatings of varied colors which adhered with wonderful tenacity to the stone surface and were polished down with the utmost care, not reducing the relief or distinctness of even the shallowest sculpturings, but being made by skillful manipulation to emphasize and refine these features.

During the great days of temple building the scenes about and within one of these Maya cities must have been exceedingly animated and novel. The hosts of people planning and directing the work; quarrying, cutting, transporting and lifting the stone; burning lime, carrying water, mixing mortar, hewing wood, preparing paints, and engaged in the work of building and decorating, must have furnished scenes in striking contrast with the desolation of the dismantled and forest buried cities of today.

SUBSTRUCTURES. The ancient cities of Yucatan were built on plains or on comparatively level ground and were without the ad-

PL. II. FRAGMENT OF HEWN STONE FROM CHICHEN-ITZA.

Showing marks of the implements with which it was shaped. The upper surface was flaked off by strokes from an edged tool, as indicated by the white lines near the margin, and the face was rough dressed by pecking with a pointed tool.

FRAGMENT OF HEWN STONE FROM CHICHEN-ITZA.

vantage of bold natural features, but art largely supplied this want, and no nation of builders, save possibly the Mound-builders of the Mississippi Valley has ever equaled this people in the number, variety and size of its terraces and pyramids; however, there appear to be no pyramids that are mere pyramids, no terraces that are mere terraces; all or nearly all were constructed to support buildings, altars or idols, and their diversity of size, contour and position give striking and picturesque results. Usually the substructures are square or rectangular in plan. The largest reported in Yucatan is upward of 500 feet in length and width, and the height of the loftiest reaches nearly 100 feet. The sides slope at various angles and some are practically vertical in whole or in part; many rise in steps, the succeeding terraces or platforms being of equal or unequal height and of varying horizontal extent. As a rule they are or were faced with stone which was dressed smooth or plastered. In the finer structures the terrace faces were panelled in hewn stone or embellished with moldings or with sculptured or stucco reliefs. The corners were often rounded and formed of large and specially sculptured stones. They were ascended by substantial, generally steep and wide stairways on one or more of the sides. The interior mass was constructed of earth and stones or mortar and stones usually forming a solid or well compacted body. In cases, however, this pile was not depended upon as a sufficient support for the superstructure, and foundation walls were carried up from considerable depth or from the ground level. The upper surface was generally floored with cement, though paving with slabs is occasionally seen. No doubt these piles were in cases the result of a long period of growth, and it probably sometimes happened that when a loftier structure was desired ground floor apartments were filled in solid with rubble or masonry, giving firm foundations for a second story or superstructure. In some cases the exterior of vertical-walled substructures was enforced by abutting masonry entirely encasing the original nucleus and giving the effect of an ordinary sloped terrace or pyramid.

In Fig. 1 a few examples of terraces and pyramids are presented in outline. The variety of contour is very great and it may be said that no two specimens are alike. The most unique form is that of the Temple of the Magician at Uxmal, *h*, which is oblong in plan and rounded at the ends; the loftiest is that of El Castillo at Chichen, which is of the stepped type seen in *f;* while the grandest and most diversified in contour is that of the Governor's House at Uxmal, shown approximately in *g*. In *a*, *b*, *c*, *d* and *e* we have what may be regarded as the most common forms. The substructure of the Temple of the Tigers at Chichen, *i*, is peculiar only

in being associated with the great wall of the Tennis Court or Gymnasium.

STAIRWAYS. The stairways of the Maya pyramids (see Fig. 1) share in a large measure the boldness and magnitude of the constructions with which they are associated and of which they form an essential part. A single stairway would have afforded all necessary access to the lofty summits, but it is not unusual to find two flights, and three or even four flights are known leading to the same temple, and each built on an equally grand scale and finished with like elaboration. All are exterior and centrally placed, leading directly up the face of the pyramid. Usually they are wide and bordered with some kind of solid balustrade. The favorite design for the rail is a colossal serpent, the head with wide open mouth and protruding tongue extended upon the ground, the body, appropriately carved, extending to the summit. In Yucatan the steps are neither high nor wide, averaging perhaps a foot in rise and a little less in tread. The pitch is thus 45 degrees or more. The stones used are generally rather small and not very smoothly dressed or well fitted, and it is probable that all important flights were finished in cement and color. The stairway usually conforms to the slope of the pyramid or shows only a little relief therefrom, but occasionally the angle is reduced, throwing the base out from the base of the pyramid, suggesting the graded way of the Mound-builders. Where associated with a vertical or very steep ascent or a series of rises, it is built out solid or carried over arches, as in the Palace at Chichen. Interior stairways are not found in pyramids and are rare and unimportant in the superstructures; the winding stair in the round tower at Chichen and the several narrow flights in Palenque being perhaps the best known examples. The most interesting stairways met with on the voyage are in the courts of the Palace at Palenque. Here large stones were used, on the faces of which are glyphic sculptures. The evolution of the stairway in its various forms was probably simple and natural and seems to present no problems—no obscure passages—worthy of particular discussion.

SUPERSTRUCTURES. I cannot undertake in this place to give more than a mere outline of the leading features and characteristics of the many buildings visited. A few only of the larger structures are built on the ground level of the site, though many are but slightly raised. In some cases the terraces and pyramids have developed in sections by the addition of parts needed to accommodate new buildings, and again, as already mentioned, the supporting pile has been built and completed at once to receive the superstructure upon its

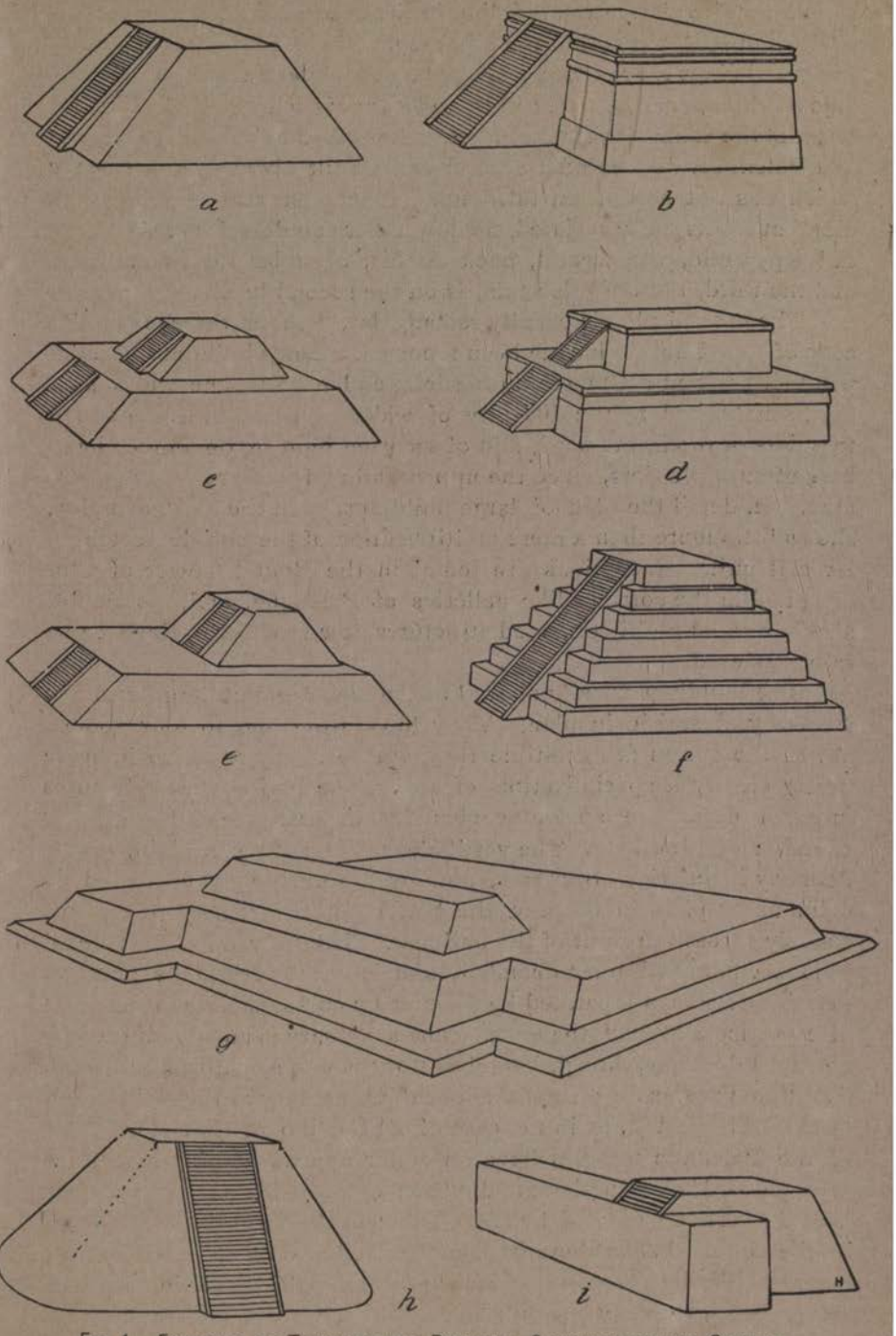


FIG. 1. EXAMPLES OF TERRACES AND PYRAMIDS, SUPERSTRUCTURES OMITTED.

summit. The plan of the building in the one instance is often composite and irregular and in the other is simple and regular. A number of buildings may occupy a single large foundation mass, and buildings or chambers may occur independently of each other on different levels of the same substructure. In a few cases only, as at Tuloom and Palenque, do we find a second story built above a lower story which has not first been filled up. Where several buildings of different levels are associated, the lower tier stands against the base of the pyramid, the second, back of this, occupies the first terrace, and the third, back of this again, is on the second level.

The ground plan is usually rectangular, two or three examples only of round houses having been reported. Large buildings of independent position are mostly rather long and narrow, the width having been limited by the difficulty of widening the arch where one or two tiers of rooms are used, and of securing light in the inner chambers of multiple tiers, since the upper wall and roof are never perforated. In detail the plan of large buildings, even the most complex, shows little more than a mere multiplication of the simple rectangular cell unit. Exceptions are found in the Round Tower of Chichen and in the corridor-like galleries of Palenque, and, no doubt, also in several multi-columned structures now too much ruined to be fully analyzed.

The buildings usually classed as temples are not large and are generally squarish in plan. They have from one to four rooms. When the rooms are multiple they are so arranged as to indicate pretty clearly a specialization of use. The two essential features in such cases are an outer chamber or vestibule and an inner chamber or sanctuary. The vestibule is entered by a plain, single doorway in inferior structures, and by a wide doorway divided by columns or piers in those of the better class. Usually it extends entirely across the front of the building. The fully developed vestibule is a modified outer chamber, and is characterized by multiple exterior doorways separated by piers or by columns, giving the effect of a portico closed at the ends. The sanctuary is mostly entered by a central doorway, though lateral entrances are sometimes provided. Additional rooms are arranged about the sanctuary at the right or left or extend behind it, as in the case of El Castillo at Chichen. Most of the Palenque temples have an outer apartment of the vestibule type, entered between piers; and a back apartment enclosing a small roofed sanctuary, entered by a single door. Small rooms are placed at the sides. When there is a single chamber only, which is not uncommon, it exhibits frequently the characters of the vestibule. Altars are rarely found, the only example met with being in a small temple on the

Island of Mugeres. In Fig. 2 a series of temple plans is given, illustrating the remarks just made. I take it that, if these varied structures are properly called temples, any apartment or any suite of apartments in any building may have served the purposes of a temple,

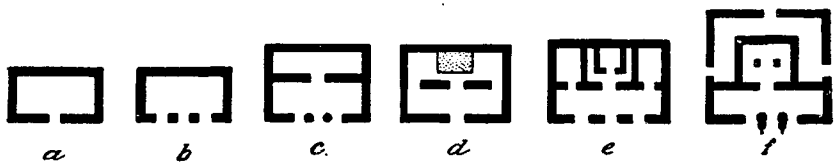


FIG. 2. SPECIALIZATION OF THE GROUND PLAN OF MAYA TEMPLES.

a Single-chamber building with plain door.
b Single-chamber temple with wide doorway and two square columns.
c Two-chamber temple, the vestibule with wide doorway and round columns, and the sanctuary with single plain doorway.
d Two-chamber temple, the vestibule with simple doorway, and the sanctuary with three doorways and a low altar.
e Four-chamber temple, Palenque type, the vestibule with three entrances and two squarish piers, the sanctuary with tablet chamber, and two small lateral chambers.
f Three-chamber temple, Chichen-Itza type, the vestibule entered by wide portal with two serpent columns, the sanctuary enlarged by introducing two square columns to support the triple vault, and a long gallery with three doorways extending behind.

though the term may not with propriety be applied to any structure not showing peculiarity of placement or style, in which there is not some variation from the mere grouping of simple chamber units.

Ordinary doorways are single and give entrance to a single room or, at most, to a suite rarely having more than two or three rooms. Back rooms are entered by doorways closely resembling the outer ones, getting all their light through them. The various forms of doorways are described farther on.

Apartments of all classes and all vaulted spaces are, with a few exceptions, limited in width by the capacity of the native arch to twelve feet or less. The length has no necessary limit, reaching in cases sixty feet or more. Such long rooms may be entered by a number of doorways and thus approximate the corridor type. It is reasonable to suppose that some of the buildings, now represented by piles of debris from which protrude multiple rows of columns, as at Chichen and Aké, were much more expansive in their apartment spaces which were rendered coalescent by the use of columns instead of partition walls. A notable feature of the plan in quadrangular groups of buildings is the gateway or wide, arched passage which opens through one of the outer buildings into the court.

The greater Maya buildings, though at times appearing complex in plan, are really exceedingly simple. The unit is the single cell or chamber seen standing alone in *a*, Fig. 3. The building shown in *b* consists of several units combined in one; variety is given to the plan in unsymmetrical structures by adding other units in less uniform ways and

of varying size. The building shown in *d* differs from the preceding in having a sloped instead of a vertical entablature, the interior arrangements being much the same as in *b*. A sketch, intended as a restoration of the Caracol or Round Tower of Chichen, is presented in *c*.* This edifice contains two circular, concentric chambers identical in constructive principle with the rectangular forms. In *e* we have the Palenque type of temple, and *f* is the square tower of the Palace at Palenque, the plan and construction of which are peculiar in several respects.

WALL SURFACES, CEILINGS, ROOFS, ETC. Under the head of masonry I have given some details of the composition and construction of the walls and buildings; these need not be repeated here. The walls are massive, ranging in all important buildings from three to five feet in thickness, and in special cases reaching eight or nine feet. Though the so-called Gymnasium ramparts at Uxmal and Chichen are much thicker than this, they are not to be classed with the walls of buildings. The exterior wall faces are seldom pierced or interrupted save by doorways, vaulted portals and small openings, the latter probably intended for ventilation, and in Yucatan, with some exceptions, they rise vertically or nearly so to the full height of the buildings. In the Palenque or Usumacinta province, the upper wall or entablature zone usually inclines inward, conforming more or less closely with the slope of the arch within. On the inside the walls rise vertically to the spring or base of the arch, a height varying from a few inches to ten or twelve feet. The inclined surfaces of the arch, in each apartment or covered space, slope inward from the sides, and sometimes also from the ends, at an angle of from fifteen to forty degrees from the vertical, and either meet at the top in a sharp angle, as seen in a few cases at Chichen and elsewhere, or approach to within a foot or two the narrow way, when they are connected by horizontal slabs and firmly held together by the superincumbent roof-masonry. Flat ceilings supported by wooden beams occur in a very few cases, as at El Meco and Tuloom on the east shore, but many of the buildings now roofless were probably so constructed. Stone beams were used for short spans, as in miniature apartments, narrow openings and passageways.

The treatment of the interior wall surface is not greatly varied, yet within a limited range presents some interesting features. It is remarked that the apartments are little broken up by fixed features such as steps, stairways, niches, altars, tables, mouldings and the like, and there are but slight signs of the former presence of movable furnishings such as might be expected in fully occupied

*It seems reasonably certain that the walls of both stories of this building were vertical as indicated, but the number and position of the openings of the upper turret, and the character of the platforms, or roofs, remains problematical.

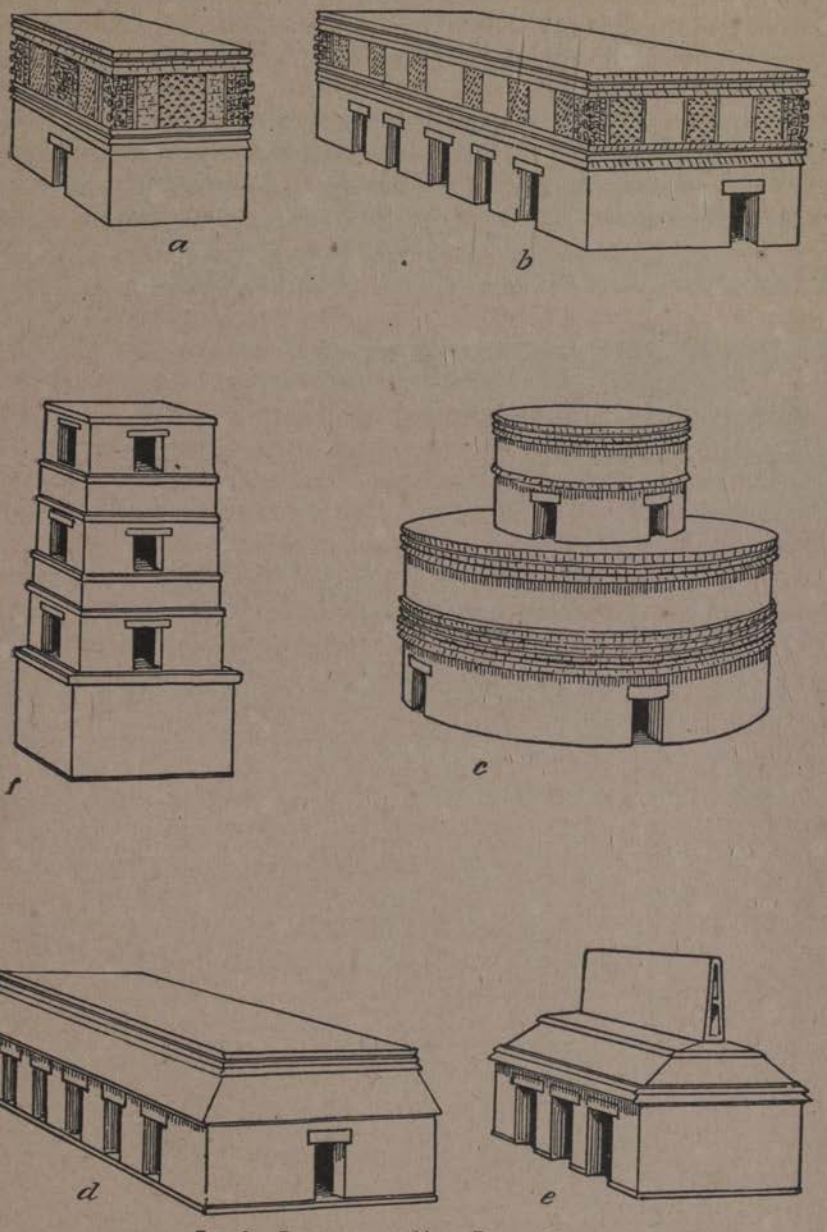


FIG. 3. EXAMPLES OF MAYA BUILDINGS.

a. Single-chamber building—a unit of construction.
b. Multiple chambered building—an assemblage of 12 or 14 units.
c. Restoration of circular building, Chichen-Itza.
d. Building with sloping entablature, Chichen Itza.
e. Temple with sloping entablature and roof-comb, Palenque.
f. Square tower of four stories, Palenque—roof restored.

domiciliary chambers. High up in the arches are occasional cross-beams or poles set in the masonry as if to support the sloping walls while the mason was at work, and probably used incidentally for suspending hangings or property. At the sides of the doors are numerous sunken cord-holders—a kind of dumb-sheave, as sailors would say—carved or built into the masonry, by means of which textile hangings were probably suspended or held in place. Illustrations of these devices are given in Fig. 4. In *a* we have a good example of the

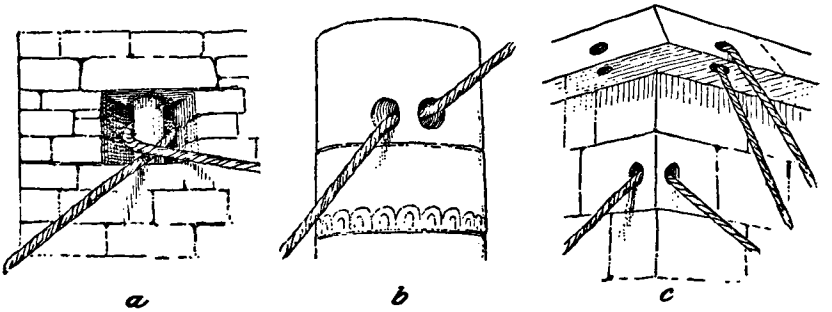


FIG. 4. CORD HOLDERS OR DUMB SHEAVES.
Cords are introduced to show probable manner of use.
a Form of dumb-sheave built into the masonry wall.
b Drilled cord-holder in back of column.
c Cord-holders as used in moldings and corners of jambs and walls.

dumb-sheave holder typically developed at Palenque. It is built in the plain masonry wall. The depression is seven inches high and ten inches deep and the small stone cylinder is four inches in diameter and sets back about four inches from the wall face. This form is usually found on the inside of doorways, a foot or two back from the jamb, and distributed in rows of three or four from lintel level to floor. Example *b* is of the countersunk type and occurs in the back of a serpent column at Chichen-Itza. The same type is utilized in corners, eaves, moldings and the like as shown in *c*. These sketches represent the better class of holders. Many examples are so poorly made that they would not withstand a strong pull by an able-bodied man, and some are modeled in plaster.

In interior as in exterior walls, the masonry exhibits all grades of finish from the rough, unhewn, irregularly laid stone facing to the perfectly dressed and coursed surface; the rougher surfaces were generally plastered and very many were finished in color. Small, dark, unimportant chambers, passageways, etc., were given but little attention. In cases the surface is carved elaborately, as in the ground floor apartment in the Temple of the Tigers at Chichen; and in other cases the walls were covered with paintings of mythic or historic subjects or with conventional decorations in color, as in the upper building in the same ruin. Exceptional features of interior construction

and finish are observed in Palenque, where the walls of sanctuaries are covered with inscribed limestone tablets and stucco reliefs. In other cases, as in the Palace at Palenque, the walls are embellished with elaborate stucco devices and figure subjects in relief, all richly colored.

Exterior wall surfaces, especially the façades of buildings, embody many striking characters. They exhibit all grades of finish, from the mortarless wall of rough irregularly laid stones, to the unbroken field of sculptured or modeled decorations. As a rule they are plainer below and increase in richness of treatment toward the top, terminating, in many of the great structures, in flying fronts devoted exclusively to decorative effect. Of the same order as the latter is the central roof-comb found in many buildings, and well illustrated by the House of the Pigeons at Uxmal and the Temple of the Cross at Palenque. The treatment of façades indicates a pronounced love of display on the part of the builders, and in many cases at least nine-tenths of the labor expended on a building is represented in show alone.

Among the most persistent features of the mural surfaces in Yucatan are the two lines of moldings, one of which extends around the building nearly midway in its height, and the other at the top associated with the coping stones. The mural space is thus divided into two zones of nearly equal width, the upper representing the entablature of classic styles. In the Usumacinta province, where the entablature zone slopes backward, the inferior and superior moldings are less uniform in profile, and less pronounced in character. The lower zone is usually nearly plain and contains the doorways; the upper is finished with symbolic and decorative sculptures. The high arched gateways or portals which penetrate some of the buildings, usually giving entrance to the court, extend upward into the upper decorated zone. The flying façade sometimes added above to give extra height repeats, in a measure, or continues the decorative features of the entablature zone below. The same may be said of the roof-comb, but this feature, in one case at least—the House of the Pigeons at Uxmal —repeats both the lower and upper mural zones.

The illustration given in Fig. 5 will serve to indicate sufficiently the construction and relations of the various features of an ordinary Maya building. The upper part of the sub-structure or pyramid is included and shows the stairway at the left, approaching the front doorway, and a plain slope at the right. Details of the masonry of this mass are somewhat hypothetical, as I have not been able to determine whether or not it is the rule that a special foundation wall with vertical outer face was built from the ground up, but it is certain that this was often the case, and that the stairway and abutting masonry were afterward added, as here shown, transforming the vertical-faced sub-structure into a sloping one. The floor is cemented as a rule,

but occasionally is flagged, and the inner floor is in cases a step higher than the esplanade without. The superstructure here utilized, has two chambers, or two tiers of chambers, vaulted with the ordinary arch, and the walls are vertical without as is usual in Yucatan. The nature of the facing and hearting is shown in section in the back wall at the right, and the illy jointed and bonded masonry is correctly represented. The use of larger stones in the jambs of the doorways is indicated at the left. At *a* is the plain lower wall with doorway at *b*, and above is a sectional view of the wooden lintels, *c*. The front and back chambers are connected by a second doorway, *d*, identical with the outer one. The sloping sides of the corbellate or offset arch, dressed with the bevel, are seen at *e* and the capstone is at *f*. Special features seen within the rooms are the small, square, wall perforation at the right, the poles or braces within the arch above, and two forms of cord fasteners—not large enough to be clearly made out—at the side of the inner door. One pair of these is made by drilling holes from adjoining faces of the stone until they meet, and the other by building a deep depression in the surface of the wall into which is fixed a vertical piece of round stone. The medial moldings, separating the two mural zones, typically developed, are shown at *g*. The upper zone with its sculpture-mosaic surface is seen at *h*, and the upper or frieze molding and coping course appears at the top, *i*. Continuous with the façade plane is the false or flying front, repeating the decorations of the façade proper more or less faithfully, and solid or perforated as the builder pleased or the nature of the ornament suggested. In some cases this feature is repeated in the same form over the medial wall of the building, but more frequently we have a more ambitious roof-comb, as indicated at *k*, and typically illustrated in the House of the Pigeons, Uxmal. It appears that the two forms are not likely to occur on the same structure. Details are given in other connections. In the drawing the combs are disconnected from the building so that the ordinary roof may be seen in its level simplicity.

DOORWAYS AND OTHER WALL OPENINGS. The wall perforations of Maya buildings may be arranged under six heads. They consist of (1) simple rectangular doorways with jambs, lintels and sometimes sills, (2) multiple or compound doorways in which the wide void is divided by one, two, three or more columns or pillars, (3) arched doorways which are of rare occurrence, (4) certain window-like openings or air holes of small size and varied shape, (5) the diversified openings in flying façades and roof-crests, some representing the interspaces of geometric ornaments, and others resembling doorways in their construction, but serving no function save that of embellish-

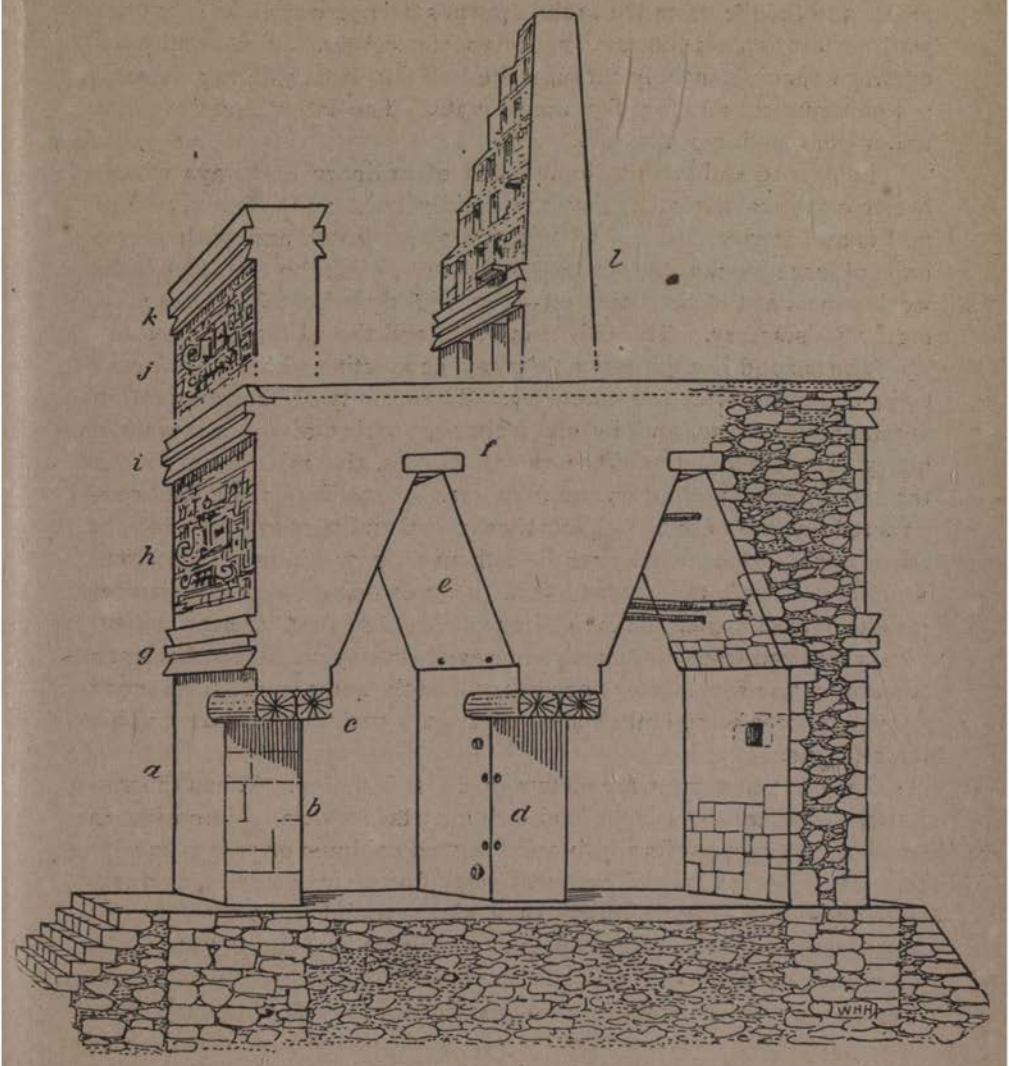


FIG. 5. TRANSVERSE SECTION OF AN ORDINARY YUCATEC BUILDING.

The upper part of the pyramid is shown with the stairway at the left.

a. Lower wall-zone pierced by a plain doorway.
b. Doorway showing squared and dressed stones of jamb.
c. Wooden lintels cut midway in length.
d. Doorway connecting front with back chamber and showing position of cord holders.
e. Inner face of arch dressed with the slope.
f. Ceiling, or cap-stones of arch.
g. Lower line of mouldings, a survival of the archaic cornice.
h. Decorated entablature zone.
i. Upper mouldings and coping.
j.k. False front with decorations, (occasionally added).
l. Roof-crest with decorations, (occasionally added).

ment, and (6) the so-called arched portals or gateways which are not wall perforations in the same sense as the others, but vaulted passageways opening entirely through the building from side to side, and not communicating with the apartments. The latter are described under the heading of *the arch.*

In Figs. 6 and 7, two illustrations of ordinary doorways of the better class are given. They are solidly built and effective. The first is an exterior doorway with heavy stone lintel, and with jambs built of large blocks well dressed and laid. With the serrate lattice-work panels at the right and left—very slightly indicated—the effect is highly satisfactory. The height is seven and the width four feet.

The second is an interior doorway connecting the corridor of a Chichen temple with the sanctuary. The solidity of its construction is a marked feature, and its chief characteristics of design are the heavy pilasters and the three zapote lintels, the middle one, lower than the others, resting on the pilasters. These lintels in a well constructed doorway are usually neatly squared and perfectly fitted to the stone work. Occasionally we find them only partially squared and of meagre length, the spaces left at the ends being filled up with mortar and bits of stone. It is not improbable that such inferior adjustments resulted from the insertion of new beams by indifferent workmen as decay made replacement necessary. Both jambs and lintels in such doorways were often embellished with elaborate sculptures or glyphic inscriptions.

Two fine doorways are shown in Figs. 8 and 9. When the ambitious builders desired to make the portal especially imposing in effect they increased its width and inserted columns or pillars to support the long lintel which was made up of as many sections as there were openings. Fig. 8 illustrates a single round stone column with square cap, supporting the contiguous ends of two stone lintels, the other ends of which rest on square-capped jambs. In the same edifice with the above there are also examples of the use of two and three columns, giving very pleasing effects. Perhaps the most effective and striking style of temple entrance in Yucatan is that sketched in Fig. 9. The opening is some 20 feet wide and 8 feet high, and is divided by two massive columns sculptured to represent feathered serpents; these are fully described in the succeeding section. The lintel in this doorway consists of three sets of beams, two or three to a set. Both the front beam and that facing the corridor are well squared, and the middle beam, when there are three, is less carefully dressed.

Another phase of the wall openings of these buildings is seen in Palenque, where the numerous doorways are so close together that the wall is represented by a series of piers only extending nearly all the

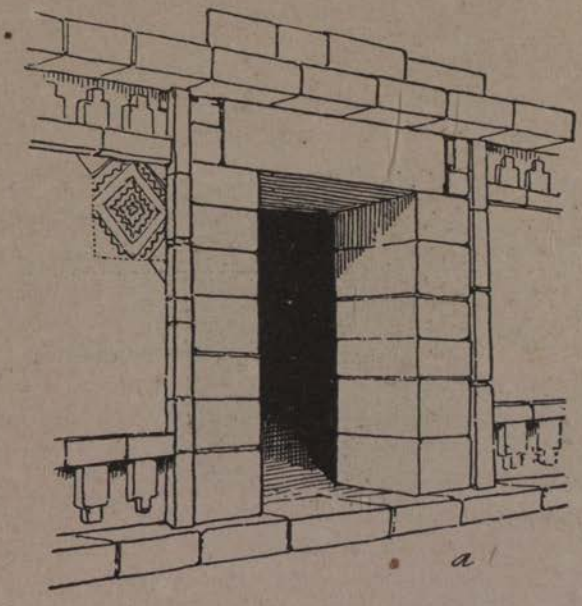


FIG. 6. EXTERIOR DOORWAY.

Of simple form but tasteful finish. The lintel is of stone and the jambs are built of large, well-dressed blocks.

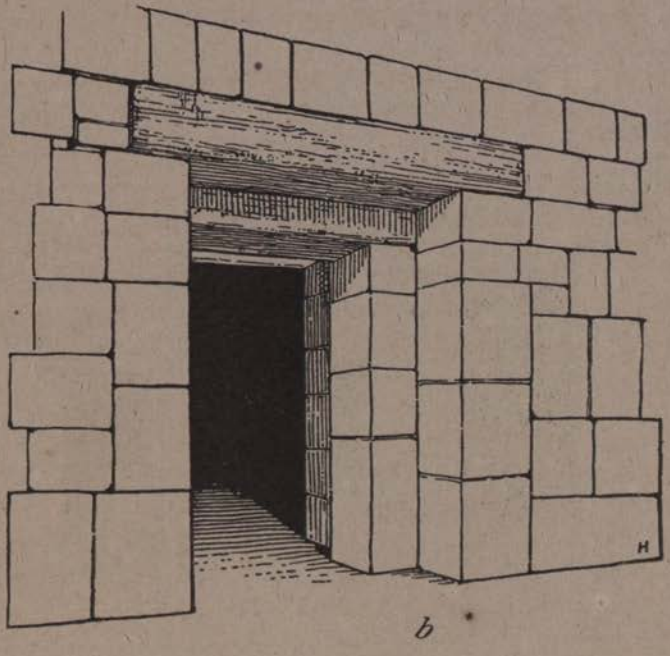


FIG. 7. INTERIOR DOORWAY.

Of massive construction with lintel composed of three well-squared wooden beams, the middle beam resting on the pilasters.

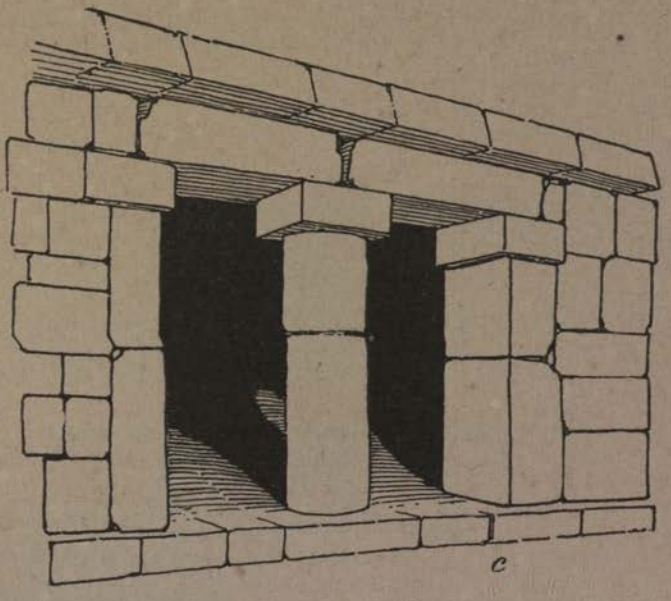


FIG. 8. WIDE EXTERIOR DOORWAY.

Divided by a single round column supporting stone lintels.

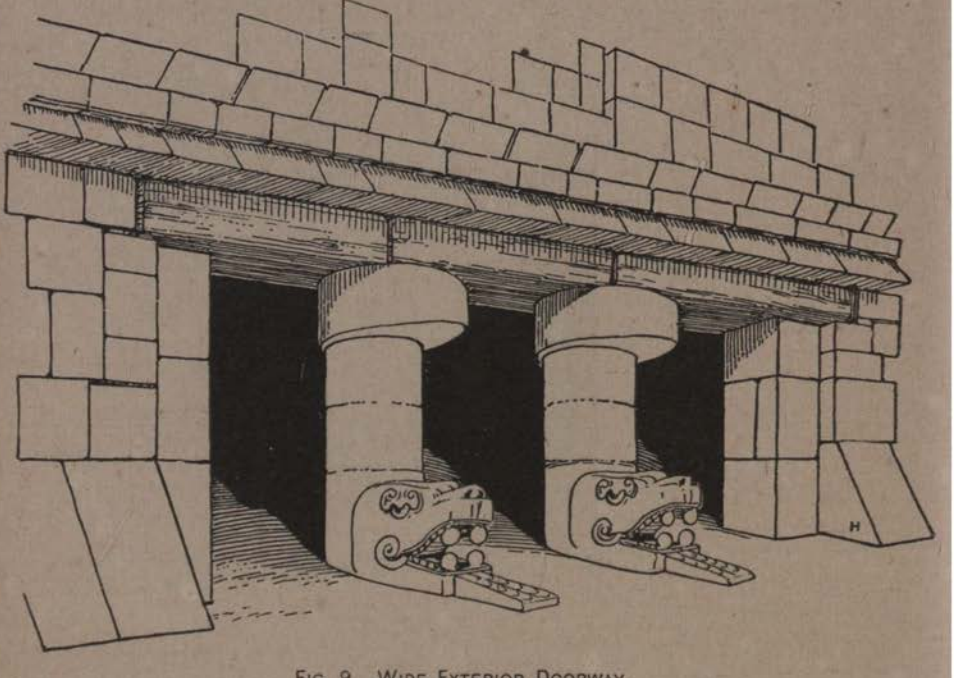


FIG. 9. WIDE EXTERIOR DOORWAY.

Of highest class, with two massive feathered-serpent columns supporting wooden lintels.

way around the building. There are ruined buildings in north-eastern Yucatan which bristle with rows of columns, and it seems probable that in such case the whole structure or a large part of it may have been supported on these columns without enclosing walls, thus leaving continuous openings separated by round columns; naturally structures of this class would fall into ruin before those supported by strong walls. The other varieties of wall perforations, save the minor forms represented by the three examples shown in Fig. 10, are sufficiently described in their proper connections.

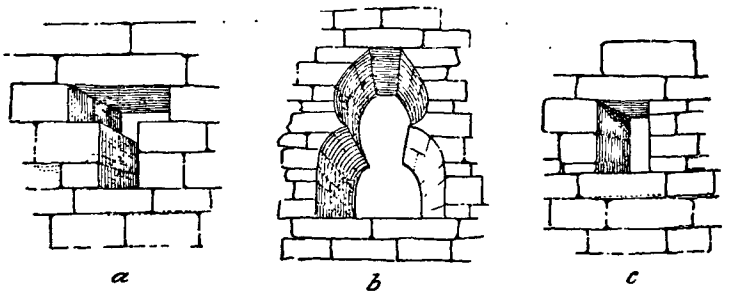


FIG. 10. MINOR WALL OPENINGS.

a Represents the tau-shaped opening most common in Palenque; it is seldom more than 20 inches in height.

b Is a window-like opening some 6 or 7 feet in height, occurring in partition walls only, in Palenque.

c Is the usual form of perforation in Yucatan. It is from 6 to 12 inches in height, and often roughly constructed.

COLUMNS AND PILLARS. Developing *pari passu* with the doorways and arches we have a great variety of pillars and columns. The American column, in the nature of things, exhibits certain parallelisms with the columns of the eastern continent, but in all departures from the most elementary treatment and use it may be said to be characteristically American. Square columns, most numerous in Chichen, are well illustrated in Pl. XVI, and pillars or piers, typically developed in Palenque, were usually simple in form though often embellished with elaborate sculptures or plastic designs in low relief, whilst the round column had advanced beyond the more elemental form with its shaft and simple cap, and was given, in whole or in part, varied and remarkable life forms, the feathered serpent being the favorite motive embodied. Among the most striking features of the great buildings of Chichen-Itza are the massive serpent columns, and on the Island of Cozumel, in a diminutive temple, the life-sized figure of a human being or man-like ape is sculptured in high relief against the face of the column.

Columns were usually assembled in pairs, where introduced into

doorways to support the entablature, but appeared in groups and rows numbering scores or hundreds where extended façades or large roof areas were supported. Few specimens are monolithic, save in the east, as at Cozumel, where the size was reduced to a minimum and the available stone was perhaps more than usually massive. The proportions are considerably varied, but all are short and heavy. The diameter is to the height, approximately, as 1 to 3½. The square column is always built up of a number of heavy blocks.

The round column had become such a familiar feature of the building art that it was employed outside of its normal range of functions, appearing very frequently in the field of pure embellishment. In many of the Yucatec buildings it was used, on a reduced scale, to decorate the façades, where it was effectively introduced in moldings and friezes, forming long rows set in contact side by side. Generally the form was rounded only in front, while the back was flat or uneven and set in mortar. The form was varied in cases by formal moldings encircling the shaft, giving the effect, in a simple way, of our turned balusters.

The genesis of the stone column would seem to be easily made out, as prototypes are found in the wooden and stone roof supports employed in most primitive structures. The association with it of animal forms may perhaps be satisfactorily explained on the assumption that the figures or monsters embodied represent the divinities associated with the temple of which the column formed a conspicuous part. This association is in marked contrast with the more rational use of vegetal forms by the Egyptians and Greeks, though animal forms and figures of men and women were occasionally used in those countries. The association of animal forms with portals and columns was more common in the far East. It is notable that the round column was more generally and freely used in eastern Yucatan, as on Cozumel Island, at El Meco, Chichen, and Ake, than elsewhere. At Uxmal I saw no compound doorways and hence no portal columns, and in fact no columns of any kind, and at Palenque heavy flattish pillars, mere sections of the perforated wall, take their place.

The drawing of a column, introduced as a frontispiece to this paper, Pl. I, is made up from portions of two examples preserved in Chichen-Itza. The close likeness of all the remnants of this class found here makes it apparent that the type was well established and uniform in fundamental features, so that a composite derived from two or more specimens may give a very correct notion of this remarkable feature of the Chichen temples. The head, or base, is drawn from a well-preserved specimen in the Temple of the

Tigers, Gymnasium group, and the shaft and capital—the body and tail of the serpent—are drawn from this and from specimens supporting the entablature at the eastern entrance of El Castillo. The position of these columns in the temples is fully described and illustrated in the accompanying pages. The massive head, projecting forward at the side of the portal, almost meets the upper end of the balustrade of the stairway, which also terminates in a similar head at the base below. The extended tongue, preserved in several cases, is two feet or more in length and is made of a separate piece of stone fixed in the end of the lower jaw by means of a tenon. The attitude of the head is indicative of alertness and ferocity, the mythic monster being strongly characterized. The mouth is open, showing fangs above and below and rows of teeth at the sides. There are also characteristic palate, throat and tongue markings. A coiled appendage issues from each corner of the mouth and rests against the jaw — a feature seen in many of the sculptured monsters of this and other sections of Mexico. The nostrils are forcibly suggested and the eye is especially characteristic of the rattlesnake. The eyeballs, in one case at least, were made of white polished sea shell. The pupil was probably painted black or formed of some dark material set into its place with cement. An eye socket, seen in an example in the Temple of the Tables, is ten inches long. The head is entirely covered with neatly sculptured scales. The body or shaft is short and thick and formed of two sections of stone aside from the base section. It is elegantly finished in low relief, the sculpturings representing bands of feathers above (exterior surface of the column), and characteristic ventral markings beneath (inner surface of the column.)

The capstone is the tail of the serpent, which turns abruptly out, extending beyond the lintel, and terminates in a somewhat blunt point, not preserved, however, in any of the principal examples, as the falling of stones from the façades above have broken it away. It is my impression, formed from a study of various serpent sculptures, that the tip of the tail was given its characteristic rattle markings. The inner part of this caudal-capital is rounded to conform to the curve of the column, as seen in the Castillo examples, and strangely enough, contains reliefs of a row of dwarfish, bearded Atlantean figures in elaborate costume, placed in the attitude of supporting the lintels. It is probable that I have erred in carrying the outer of the two figures, shown in the plate, so far beyond the front margin of the lintel, as the idea plainly was that these figures, four of which remain in one case, should appear as supporters of the superstructure and not merely as decorations. The general shape of the outer extremity

of the tail is probably correctly given in the example illustrated in Fig. 40, though it is, I believe, unsculptured; possibly it was unfinished. Portions of the lintel timbers and entablature above are shown in section, and the relation of these features with the corridor and façade is shown in several subsequent cuts, as for example in Fig. 31.

The dimensions of the columns utilized in this reconstruction are about as follows: The head (base) of the Temple of the Tigers example is 7 feet 4 inches long and about 4 feet wide at the muzzle and 4 feet high. The height of the remnant of body (shaft) as it stands is 7 feet 7 inches. The whole height, if it is allowed that one shaft stone and the cap are missing, was close to 10 feet. The diameter of the body or shaft I failed to secure, but it is not far from 36 inches. The El Castillo column, used in completing the upper part of the drawing, is not so large. The diameter of the shaft is 25 inches and the full height to the lintel 7 feet 9 inches. The striking character of the Chichén temple portal and its columns, before mutilation took place, is indicated in Fig. 9. When in a perfect state of preservation and appropriately colored it must have presented a very effective and handsome appearance.

THE ARCH. The Maya arch presents a number of interesting forms and phases, all, probably, directly traceable to the more primitive forms of chamber spans or vaults in common use all over America. Among these earlier forms we have, first, the beam of wood or slab of stone connecting two lateral supports or walls and forming part of the roof or serving to support it; second, the single lean-to, in which the parts are placed against some fixed vertical surface or support; third, the double lean-to, where opposing parts are set against each other with or without a ridge pole; and, fourth, the circular lean-to, in which the parts form a cone with or without a central supporting pole. All are equally elementary, and it will be impossible to determine just which varieties contributed most toward the development of the higher forms of vault in use among the Mayas. There are, however, but two principles of construction involved in all of these spans—the horizontal span and the lean-to. The latter is never used alone but occurs in combination with the former.

The prevailing form of Maya arch is based on the horizontal span, employing not single long slabs, but a series of short slabs so placed as to bridge the void by degrees. A course of stones is laid along the top of each of the opposing walls, projecting a little, a second course is laid in like manner, and others follow until by a series of offsets the sides have approached to within a foot or two, when a course of large well-squared slabs is laid across, completing the span.

In examples employing the lean-to principle, the construction is the same up to the point of connecting the closely approximate walls. Instead of laying a course of flat capstones across, two courses were employed, set on edge on the upper courses of the walls and inclined together at the top, continuing the pitch of the walls and forming the true cuneiform arch. The object of the off-setting is, of course, to reduce the span of the void, thus permitting the use of ceiling stones of small size instead of large and long stones which were hard to obtain and easily broken, or beams of wood which soon decayed. These arches really represent the emancipation of the Maya builder from the thraldom of the wooden beam. The prevailing variety was used in all forms of chambers and also in certain large vaulted passages, as in the Palace at Uxmal, and occasionally in smaller openings, as at Palenque, but the flat span or lintel remained in nearly universal use for ordinary doorways. A unique appearing arch is found at Palenque, the sides being curved in such a way as to give a somewhat trefoil effect to the opening. The principle of construction is, however, the same as in the prevailing form of the cuneiform arch, the profile being curved instead of straight.

It is evident that considerable difficulty was experienced in carrying up the long slopes of the larger vaults, and the high angle adopted was one means of lessening the tendency to collapse. The projecting stones were largely held in place by the masonry of the body of the wall, which was carried up at the same time, but even this, especially in cases where the outer surface was also inclined, could not have prevented the frequent falling of the work when approaching the apex. In meeting this difficulty it was a common practice to use timbers—generally poles of medium or small size—which were placed across and built into the masonry as it rose, holding the walls apart. These beams are preserved in hundreds of cases and nearly every vault shows by its numerous beam sockets that this device was extensively relied upon. I believe the theory is advanced by some writer that a core of masonry was first built of the proper shape, and the vault constructed over it. I doubt if the numerous examples of masonry-filled apartments observed are satisfactory proof of this, but a careful examination of the surface finish in a room so filled might readily settle the question.

In Fig. 11 I present sketches of six examples of the Maya arch. These do not cover the entire ground, but others so far as I have seen are merely variations of the two prevailing types, shown in *a* and *b*, the first, terminating above in two rows of inclined slabs, forming the apex, and the second closed with a course of horizontal slabs. The former is seen in Chichen-Itza, but is rare elsewhere, and the

latter was almost universally used in chamber vaults. The specimen shown in *c* differs from *b* only in having the corbellate or offset margins of the stones dressed with the slope, making a plane surface. That given in *d* is identical with the preceding, save that its inclined faces are slightly curved; it is the form sometimes used in the portal vaults which open through one or more of the buildings of a quadrangular group communicating with the court. It is seen also in chamber vaults, in bridges and aqueducts. The fifth example *e* is also a portal vault typically developed in the Governor's Palace, Uxmal; indeed I cannot say that other illustrations are known. The slopes are long and it is probable that they were intended to be straight though now considerably warped, possibly by sagging. The sixth specimen *f*, is the trefoil arch of the Palace in Palenque, which is the most ambitious attempt at arch elaboration in America, and shows, in connection with kindred wall perforations in the same building, an up-hill struggle of the æsthetic in a field where construction was only blindly feeling its way.

The arch was rarely employed in ordinary doorways, exterior or interior, the few cases at Palenque being exceptional. The flat form of opening was preferred because the prolonged apex of the cuneiform arch led to troublesome complications with the interior vaults, as well as with the exterior medial moldings and the ornamented zone of the entablature.

It may be added that in numerous cases all four walls of the chamber are made to approach toward the apex of the vault, thus more thoroughly distributing the thrust of the superincumbent masonry.

The Maya builder did not often essay to construct his arch over a space more than twelve feet wide, though in the loftier buildings a much greater span was possible even with the ordinary pitch of the opposing walls. The average incline appears to be about 65 degrees, but occasional examples rise to 80 degrees, while others fall to 60 or even 55 degrees; the latter pitch would, however, give a weak construction, as the outward thrust would be increased to a dangerous degree. A building 24 feet high with roof 3 feet thick would accommodate a vault 21 feet high. If the vertical walls below are carried up to half this height, which is perhaps not far from the average relation of upper and lower spaces, an incline of 65 degrees in the opposing walls, allowing 18 inches for the capstone span, will give a vault 9 feet in width, or nearly ten feet, measured on the floor level, as there is usually an offset at the spring of the arch of from 3 to 6 inches on each side.

In the vaulted passageways through the Governor's Palace at

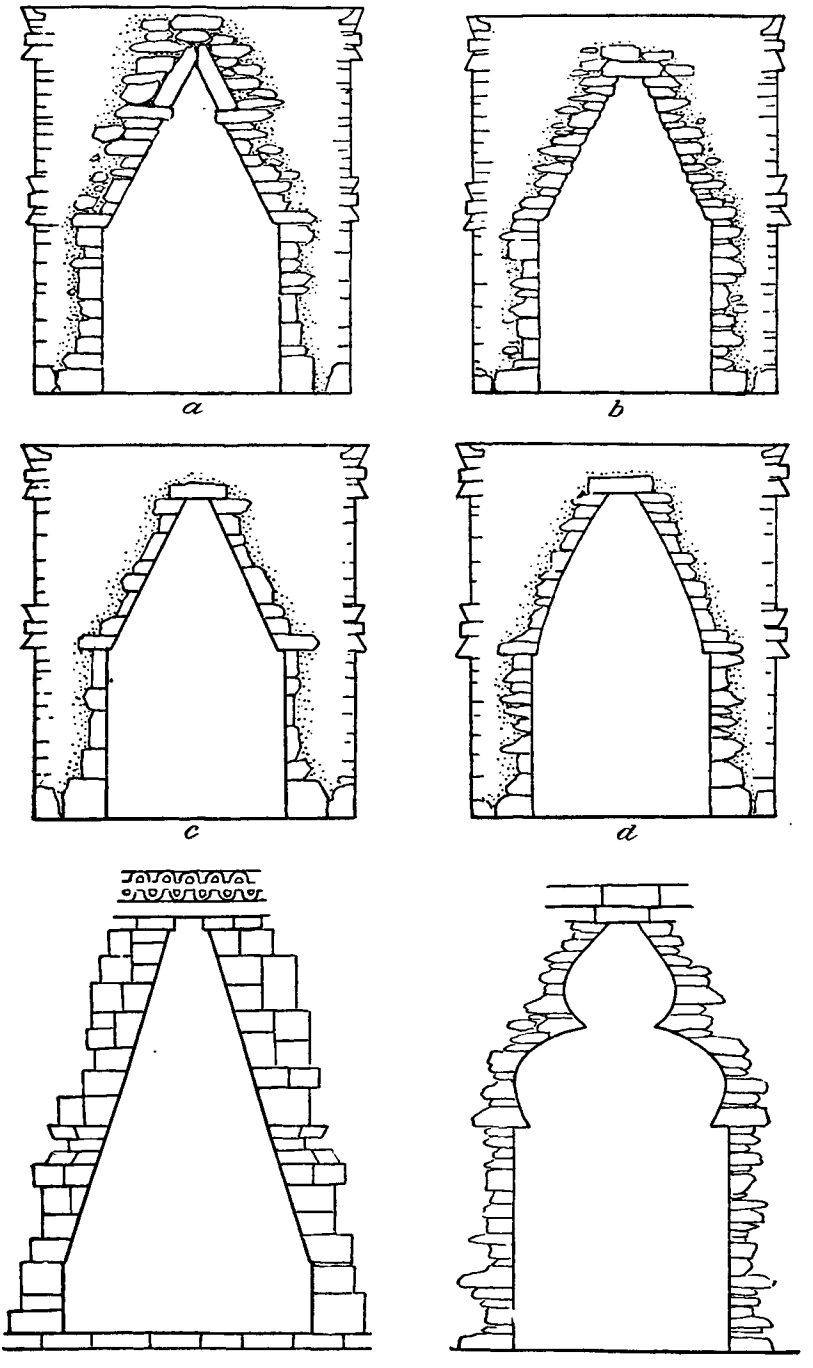


FIG. 11. EXAMPLES OF MAYA ARCHES.

a. Section of cuneiform arch with acute apex, Chichen-Itza.
b. Section of ordinary arch with flat capstone.
c. Section of ordinary arch with dressed surfaces.
d Section of ordinary arch with dressed surfaces and curved soffit slopes.
e. Portal arch with long slopes, showing masonry of exterior facing.
f. Section of trefoil, portal arch of Palenque.

Uxmal the incline of the arch begins within a few inches of the ground, so that in the long rise of 20 feet or more, even with the high pitch of 70 degrees, the width spanned is not far from 18 feet. The highest arch met with in my own investigations is in the outer annular chamber or gallery of the Round Tower at Chichen. The height is about 24 feet, while the width is only six feet; the pitch of the vault walls is therefore unusually great, and the apex correspondingly sharp. A fuller analysis of the arch and its development will be given at the close of Part II of this paper, in connection with a study of the origin and development of the stone building art of Central America and Mexico.

ORNAMENT. It is impossible to say of the ornamental art of any primitive people just what causes have operated to bring it into existence, or what ideas underlie its varied phenomena. We discover in the non-essential elaborations of these ancient buildings numerous elements surely traceable to constructive sources, but we further perceive that most of the motives employed in embellishment have their origin in religion, that their use in art was first significant and second æsthetic. It is probably safe to say that in Maya ornament nine-tenths of the elements used are, or were, present on account of their significance, or because of some associated thought, although we cannot say just how much of the original meanings were retained by the advanced peoples who continued to employ them in their buildings. It is almost certain that every life form that entered into the embellishment of temples and palaces was employed because it occupied some place in the mythologic symbolism of the builders. The serpent, the tiger, the turtle, the bird, the monster, represent mythic conceptions. Men were deities or their representatives or were depicted in scenes that relate to rites or duties of a religious nature. We may go further and premise that very many of the purely conventional designs, the scrolls, the frets, the meanders and the zigzags had meanings, hidden to the uninitiated, coming down from their less conventional phases of development. It is pretty certain that even in the latest periods of Maya history the various motives employed in decoration were not only significant, but that they were not used out of their traditional or appropriate associations, and when we see a life form or even a non-graphic device associated with a given structure we may fairly assume that it has, or had, a special significance and function in that connection.

The housing of gods and men is a simple thing and requires little more than walls and a roof, but the demands of symbolism and æstheticism make building a complex and wonderful art, adding three-fourths to the labor and cost of construction, and imposing

nearly all there is of elaboration or display. Symbolism places the figure of a divinity at the entrance to a temple because its functions are best performed in that situation, and its sculpture may be of the simplest kind, but the love of display modifies the figure, introduces it into the construction and multiplies it without limit, carrying it in rows along the walls and in panels from top to base; it heightens the walls and adds lofty pinnacles and crests to make room for increased display. Superstition modifies the column that supports the wide entablature of the temple gate, making it resemble the form of a feathered serpent, a mythic compound probably representative of a chief divinity, but only a well-developed sense of the beautiful could refine the form and array the folds, feathers and scales of the monster in varied and graceful combinations. Symbolism associates certain conventional figures, as the scroll and the fret, emblems of wind and wave, with the figure of the god of water or of the air, but æstheticism carries scroll work and fretwork over all the available spaces and multiplies and beautifies the idols until we have a maze of varied, yet withal—we may assume—ideographically consistent embellishment. Notwithstanding this general consistency, which tradition struggles to preserve, the æsthetic impulse was surely gaining ground and little by little overstepping the traditional bounds and asserting for itself the right to make things beautiful at whatever cost to significance or traditional usage. A somewhat detailed analysis of Mexican and Central American architectural ornament is reserved for the second part of this paper, as the necessary illustrations are not yet ready.

All the sculptor's work is crude as compared with civilized art, but it is virile and, to my mind, full of promise of higher achievement. Portrait sculpture was probably not practiced, or if attempted the form of expression was so conventional as to rob the representation of marked individuality. Sculpture found its subjects almost wholly within the animal kingdom, and, though we observe that species were portrayed with some degree of truth, it is apparent that with creatures as with human beings, mythic characters were of more importance to the sculptor than the realistic.

Graphic art seems to have covered pretty much the whole field of nature and art, presenting men, animals, plants and nature generally with rude vigor. Extensive subjects in bright colors, covering the walls of some of the chambers of Chichen include village scenes and battle pieces strongly suggesting the work in some of the ancient manuscripts. There is a lack of perspective, and a mixing up of sizes, and the general style of presentation is suggestive of that of the ancient Egyptians.

HIEROGLYPHS. It is not my purpose to attempt a study of the

glyphic characters, seen in considerable numbers in all the principal cities. They may readily be examined as to their general characteristics as sculptured or plastic devices, but their interpretation is a totally distinct matter and fraught with formidable if not insuperable difficulties. Looking toward the latter end, however, numerous students have begun the work of collecting and collating them, and important results have been accomplished by Stephens, Charnay, Maudslay, Seler and Thompson in the field, and by Thomas, Brinton, Förstemann, Schellhas, Valentini and others utilizing mainly the graphic and plastic copies brought together in libraries and museums.

There can be no doubt that they are representatives of a system of writing, which, though necessarily in its infancy, was entering upon the phonetic stage. The characters are, however, highly developed and complex in their constitution, a single sign employing several elements, and so fully condensed or conventionalized that the original realistic characters are largely obliterated. The most strongly marked variation from the typical "calculiform" figures is seen in Uxmal, where inscriptions in the central over-door decoration of the Governor's palace and in the Temple of the Magician are less compactly grouped, as if more archaic in character, or as if treated merely as a means of decorating the spaces occupied.

At best the sculptured inscriptions are but brief. Even the longest are limited to a few hundred characters, and the highest possible values of phonetic or ideographic elements would not enable them to express more than a few brief statements. Interpretations, if finally made, will be exceedingly interesting, but as historical records little can be reasonably expected of the inscriptions. They may be names, titles or decrees of rulers, but more probably relate to priestly matters, marking dates or indicating the nature of rites and ceremonies. They were probably understood by the priesthood almost exclusively, and before the Spanish conceived the notion that they were worth preserving the key was lost.

Technically considered, the glyphic characters of the several Maya provinces do not differ greatly save as a result of the varied nature of the materials in which they are executed. Preserved examples are usually in stone, but stucco was extensively employed in some sections, as at Palenque, and wood was certainly much used throughout the whole Maya territory. As a matter of course the same forms of writing were executed in color on walls, parchment, paper, etc., and to a far greater extent than in plastic methods. The sculptured figures are in low relief where hard stone or wood was used, and are much more boldly defined when sculptured in soft stone or modeled in plaster. In Yucatan they are very generally associated with door-

ways, columns and pillars, lintel faces being preferred, but they are found in various situations. At Palenque they are engraved upon the heavy stone steps of the Palace courts and occur most frequently associated with devotional groups of figures set into the walls of sanctuaries. The numerous stucco groups covering the pillars of the temples are generally accompanied by a few stucco glyphs and some of the pillars are devoted entirely to these inscriptions. The general character and appearance of the glyphs is shown in the specimen illustrated in Pl. VII. The Yucatec Mayas introduced glyphs into their sculpturings less profusely than did their southern brethren and the work is less refined and elegant. There appear to be no very closely analogous forms of glyphic writing in any other part of the world.

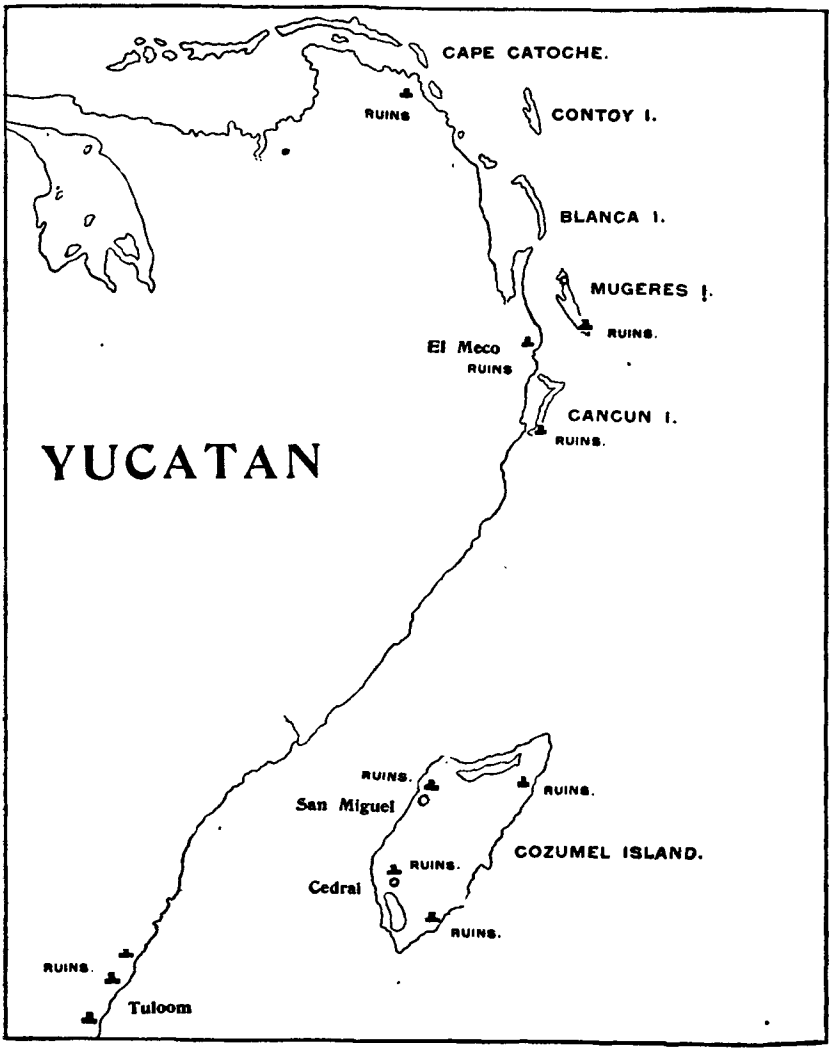


FIG. 12. SKETCH MAP OF THE SHORE AND ISLANDS OF NORTHEASTERN YUCATAN.

RUINS OF EASTERN YUCATAN.

The voyage to the eastern islands and shores of Yucatan was looked forward to by our party with exceptional interest, as the region had been but little visited by students and there was promise of numerous novel features in all the fields of observation and especially in archeology. Besides, it is a land of much reputed beauty and is rendered romantic by tales of recent piracy. The northern shore of the peninsula is low and monotonous, and not attractive to look upon, but is said to be dotted with numerous ruins and ancient dwelling sites. These were passed by with much regret, but the time at our disposal did not permit of the study of minor remains or warrant the exploration of fields with respect to which so little was positively known. Rounding Cape Catoche on the 29th of December, we reached the low island of Contoy, and stopped for an hour to visit a recent wreck, cast by the strong current of the Gulf stream upon the low reefs of the island.

MUGERES ISLAND.

Next south of Contoy comes Isla Mugeres or Woman's Island, a narrow strip of coraline limestone some five miles long and less than one mile in width, generally low but rising at the south end into a narrow promontory some sixty feet above the sea. At the north it is partially connected by a line of rocks and sunken reefs with the islands to the northwest. Our boat was piloted across this dangerous line of rocks at a point near what is known as Anvil Rock and anchored in a shallow little harbor on the west side of the island, fronting the village of Dolores, an humble fisher settlement of some 500 inhabitants. The village faces the harbor and extends back through sheltered and luxuriant groves of cocoanut palms some three or four hundred feet, to the sandy ridges bordering the sea on the outer side of the island. The island is skirted by ledges of sponge-like and cavernous limestone of recent formation, save in and about the harbor of Dolores, which is bordered by a low sandy beach.

So far as we could learn the only ruins on the island worthy of note are at the south end, and these were reached by means of the gasoline launch, from which we landed with some difficulty on the

rocky shore a little above the southern point. The promontory is very abrupt and is worn by the heavy seas into picturesque pinnacles, caverns, arches and rough outstanding masses of rock, as imperfectly in-

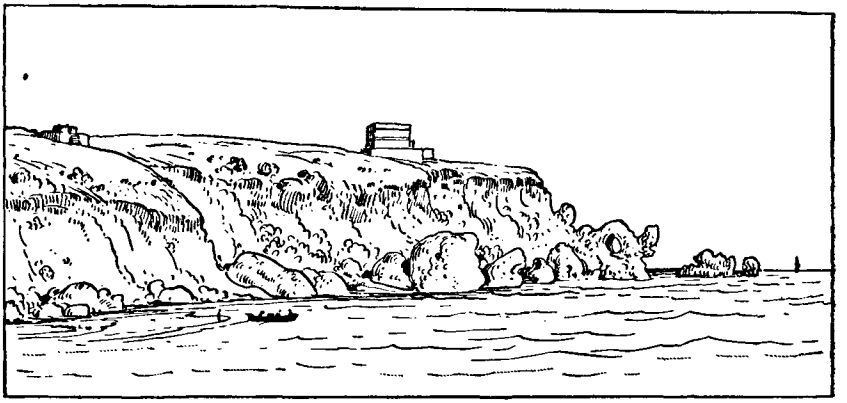


FIG. 13. SKETCH OF THE SOUTH END OF MUGERES ISLAND, SHOWING LOCATION OF RUINS.

dicated in Fig. 13. Ascending the rugged bluff and skirting the cliff to avoid the tangle of undergrowth, we encountered a small ruin near the margin of a depression in the bluff about three hundred yards from the outer point. The fallen walls were overgrown with a variety of cactus apparently peculiar to the locality and described by Stephens as flourishing on the same spot fifty years ago. As that explorer barely mentions the ruin, I present a sketch plan, Fig. 14, which shows the building to have been a small temple or shrine, with terraced base of eccentric outline, ascended by two narrow stairways having six or seven steps each. The terrace is from five to seven feet in height and some twenty-five feet in length and width. The ruined walls of the minute shrine occupy the middle of the substructure and are ten feet square, and from three to four feet in height. There appear to have been doorways on all of the four sides. The steps are of cut limestone and are retained by balustrade walls level for a short space at the top and sloped with the stair below. The masonry consists of irregular stones laid up rather carelessly in mortar, and the faces, where not originally even, were roughly dressed. The whole surface was probably evened up with mortar and possibly painted.

Passing outward along the grass-covered promontory, here quite narrow, we reached the principal ruin, Fig. 13, and Pl. III, which is a prominent and striking feature of the landscape and a valuable landmark to every sailor of these seas. This temple—for such it may be called—has been about one-third destroyed by the sea. Nearly four centuries ago the fleet of Cortez sought refuge among these islands and

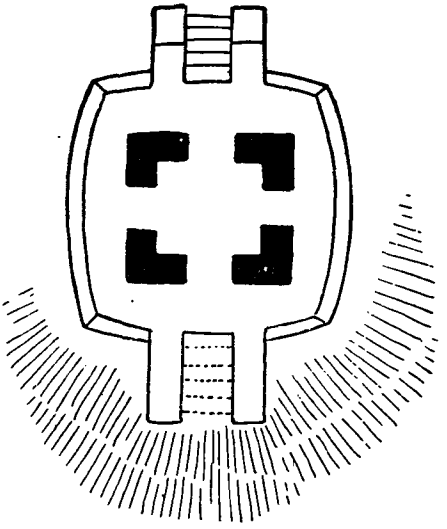


FIG. 14. GROUND PLAN OF SMALL STRUCTURE NEAR SOUTH END OF MUGERES ISLAND.

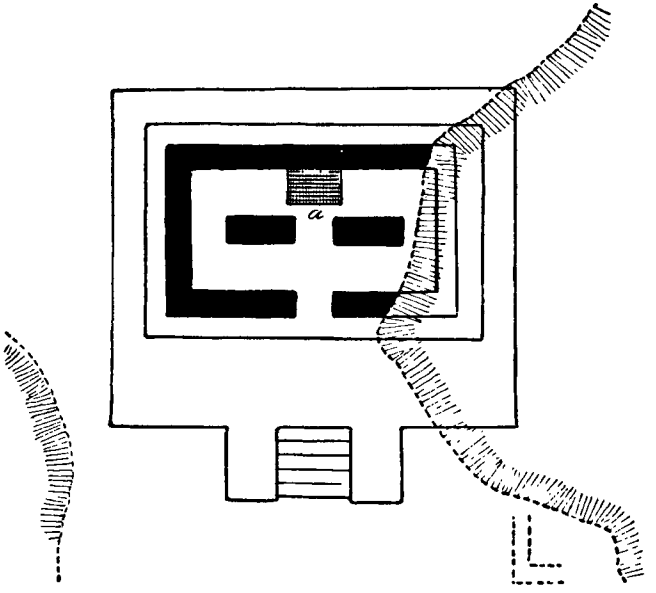


FIG. 15. GROUND PLAN OF RUINED TEMPLE AT SOUTH END OF MUGERES ISLAND.

found upon one of them, possibly Mugeres, numerous temples in which the idols worshiped represented women; the name thus suggested has fixed itself upon this island. This building was no doubt entire at the time of this visit and it is probable that there was considerable space between the base of the low terrace and the sea cliff on all sides. The destruction of the point of the promontory appears to be going on rapidly at the present time, as the waves break with great force from both sides against the underlying beds of soft limestone, undermining the harder stratum at the top and causing it to fall in great masses into the sea. The masses are quickly broken up and disintegrated and deposited as sand along the shore. At present the remnant of the temple extends from margin to margin of the promontory, a width of perhaps forty feet. This distance will soon be cut through, and the outer point, which is wider and extends some sixty feet southward from the front of the building will soon be broken down. It is apparent that originally the plan was symmetrical, as shown in Fig. 15, where the dotted lines indicate the portion lost in the sea. It does not seem unlikely that one hundred years from now the ruin and the whole point beyond it will have forever disappeared from view. That the last fifty years have dealt kindly with the structure, however, is apparent from a comparison of the photographic illustration presented in Pl. III, with the engraving* given by Stephens in Vol. I of his Yucatan.

The terrace substructure—an incipient pyramid—was originally about thirty feet long, twenty-five feet wide and four to six feet high. It is composed mainly of loose stones, with perhaps a little mortar, and is faced with large blocks, some of which have been pretty evenly dressed. Many of these stones are large, one near the outer southwestern corner measuring five feet six inches long, three feet six inches high and more than a foot thick. The narrow steps, five in number, ascend the middle of the south face of the terrace between heavy projecting walls. The superstructure is set back eleven feet from the terrace front and about a foot from the other margins and has all around it a step one foot high and from twelve to twenty inches wide. The elevation of the building and the nature of the masonry and exterior elaborations are well shown in Fig. 16. By reference to the plan, Fig. 15, it will be seen that the doorway, which is low and narrow, enters an outer chamber or vestibule from which a second door of like character opens into a back chamber at a point just opposite a low altar or shrine, *a*, while side doors at the right and left admit visitors to the ends of the

*Incidents of travel in Yucatan. Opposite page 416.

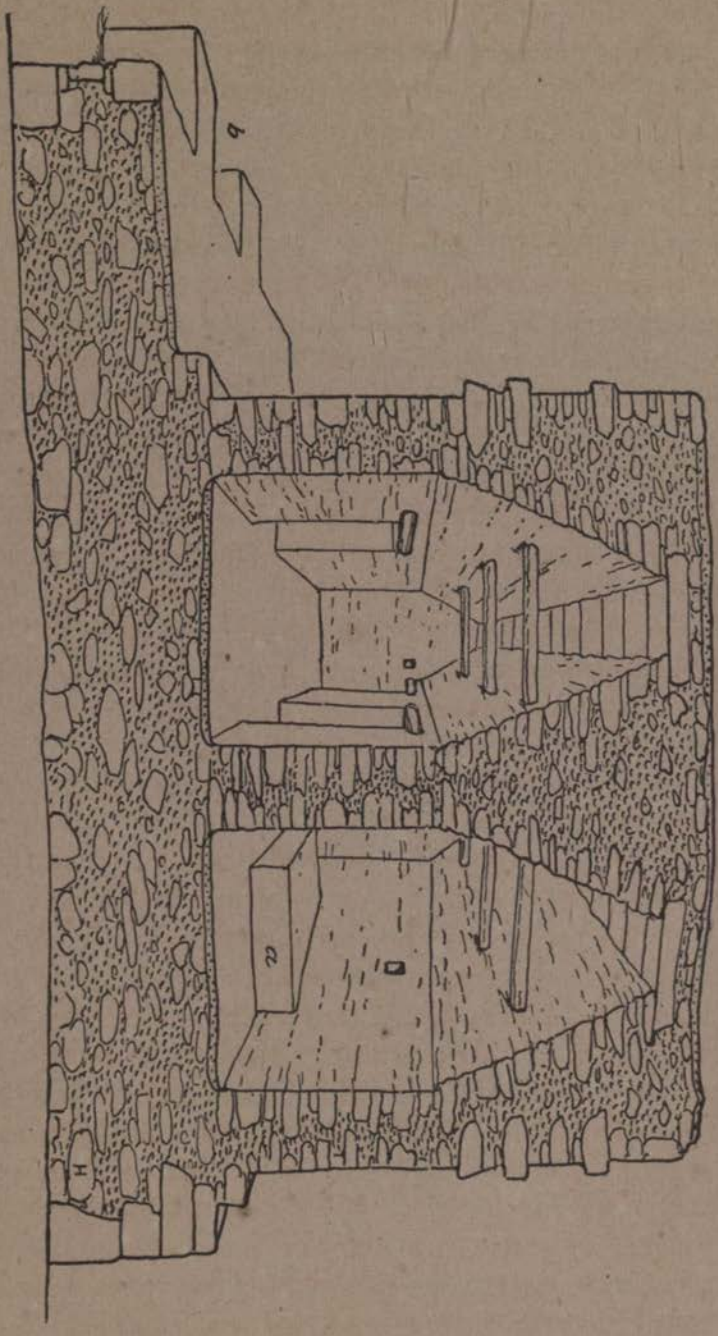


FIG. 16. GRAPHIC SECTION OF SMALL TEMPLE ON SOUTH END OF MUGERES ISLAND.

Showing character of construction and appearance of chambers.

a. Altar.
b. Stairway.

altar. The appearance and construction of the whole interior are made sufficiently clear in the illustration, Fig. 16, where the terrace, the cement floors and the peculiar masonry are clearly indicated, and the walls of the chambers, the holes in the wall, the wedge-shaped arch, the wooden beams and the altar are given in nearly their correct relations and proportions. It is barely possible that this altar is of Spanish origin, as the conquerors are said in cases to have forced the native workmen to make changes in their temples to fit them for Christian worship.

The lintels are small, round or partially squared beams of wood, probably zapote. There are two over the outer doorway, three over the central doorway, and four over the remaining side doorway. Small unhewn timbers are set into the masonry of the arch about half way up, as if to steady it while construction was going on, or to serve for suspending property or hangings. They were originally eight in number; five are in place at the present time, the left hand front one being restored in the section. At the sides of the doorway there are rudely made anchor holes drilled in the stone and probably used for fixing curtain cords. In the wall over the altar is a small rude opening, and another appears in the west wall. The walls are plastered up to the spring of the arch, a height of about 4½ feet, but above this they are rough and seem never to have been covered. The connecting stones of the arch at the top are slabs of limestone, exposed for about twenty inches in width, and long enough to extend some distance into the masonry at the sides, thus binding the arch. The roof is flat and roughly plastered, as are the outer walls. The whole height of the superstructure is about twelve feet. A little outbuilding near the southeast corner of the terrace is nearly levelled with the ground and partly fallen into the sea. It is of later construction than the main building, as the mortar is filled with potsherds derived no doubt from the sand in front of the temple. Meagre remnants of another building are observed upon the brink of the cliff a few yards to the west of this temple. But little can be learned of the original nature of the structure.

The rocky floor of the point in front of the temple steps is partly covered with debris and soil which are filled with potsherds. The ware in general seemed rather rudely made and shows a coarse, gritty matrix. The surface may have been well finished, but is nearly all removed by weathering. The forms include vases of usual Yucatec outlines and many rather elaborate figurine or idol vases. Several of the latter represent the female form, a fact apparently confirming the observations of the early Spanish explorers already referred to. This pottery is identical with a principal variety found on the main-

PL. III. RUINED TEMPLE, SOUTH END OF MUGERES ISLAND.

About one-third of the building, at the right, has fallen into the sea, the doorway having been originally in the middle of the façade. The cliff on the opposite side approaches within a few feet of the corner of the terrace. The masonry is crude and roughly coated with plaster. The narrow stairway is set between two massive buttress-like balustrades. The slightly sunken wood lintel is plainly seen, and the crudely finished, simplified moldings appear above. Full length of building proper about 25 feet; width, 14 feet; height, 11 feet. View from the south near the point of the promontory. This and several of the succeeding plates are from photographs made by Dr. C. F. Millspaugh.

RUINED TEMPLE, MUGERES ISLAND.

land of Yucatan and especially along the adjacent eastern shore, excellent examples of which are to be seen in the Museum at Merida.*

It was observed that the buildings on this island, although identical in plan and style with those of the mairland, are of small size and inferior construction and give a suggestion of meagreness and inferiority, as if they represented the mere outposts of Maya culture; yet this does not agree with the Spanish accounts, which make these islands a kind of religious centre, a Mecca, resorted to constantly by thousands of devotees from the mainland.

ISLAND OF CANCUN.

In passing south from Mugeres island to Cozumel, a halt was made near the north end of the Island of Cancun—which is a long, low strip of land showing here and there exposures of coraline limestone—to visit some of the numerous ruins, said to have been seen from passing ships, crowning the sandy crest of the island. Taking the little launch we passed behind the island through a narrow channel, and crossed a lagoon-like body of water to a point perhaps a mile above the southern extremity of the island. Here we encountered remains so extensive as to indicate an important settlement. They occupy a low, level space some hundreds of feet wide between the swampy western shore and the high sandy ridge bordering the surf-beaten beach on the east. The spot is occupied by an Indian hut, apparently the only habitation on the island, and is rendered attractive by a group of cocoa palms and patches of Indian corn, which occupy clearings in the dense undergrowth that covers the island. The buildings have been quite numerous and apparently identical in character with those of the neighboring islands and mainland. They are, however, in such an advanced state of ruin that it was not considered worth while to attempt to describe or illustrate them. The cut stone of the walls has been largely removed for building purposes. There were half a dozen pyramidal piles in the group, in which well-built walls and stairways of hewn limestone were visible, and numerous round columns were scattered about. Some of the buildings represented were no doubt temples, but, judging by the masses of debris, they were not of great architectural pretensions. Back one hundred yards from this group a somewhat more massive pile was encountered covered with dense forest. The pyramidal base is some

*I did not happen to see a paper by Stephen Salisbury, Jr., entitled "Terra Cotta Figures from Isla Mugeres," published in the Journal of the American Antiquarian Society for April, 1878, until these pages were in type. The ruin is well described and illustrated and excellent cuts of the pottery are given, the data having been furnished by Dr. A. Le Plongeon.

sixty feet long by forty feet wide and fifteen or twenty feet high. Remnants of thick, rude walls on the top indicate a structure not specifically different from those on Mugeres island. An hour's ramble through the dense growth of young forest and vines, and along the sandy ridge, developed nothing more save a pile of large, partly hewn stones near the eastern beach, opposite the group of ruins referred to above.

ISLAND OF COZUMEL.

The island of Cozumel—see map, Fig. 12—is situated sixty miles down the coast from Cape Catoche and is separated from the mainland by a shallow but charming bay from five to seven miles wide. It is twenty-three miles long from northeast to southwest and upward of eight miles wide. It is low and covered with dense forest, rendered almost impenetrable by tangled undergrowth. As far as our observations extended, the surface rises hardly more than twenty-five or thirty feet above the sea. The geological formations consist of horizontal, heavily bedded limestone of recent date, the inclosed fossil remains duplicating in many cases the species now thriving along the shore. It is probable that the sand ridges of the eastern shore rise higher than the limestones of the western side, and on the north and south they enclose considerable lagoons. The island is sparsely inhabited, containing less than 2,000 people, who live in the simplest possible manner, content to fish and raise chickens and to cultivate small fields of corn and groves of bananas. They are assembled mainly in the village of San Miguel, situated on the inner side of the island near the northern end. Spanish fishermen of Cuba have dominated in the district for a long time, and the native Maya element is as a result quite degenerate, and retains fewer traces of the ancient language and customs than in other equally isolated portions of Yucatan.

The island has always been reputed to contain numerous architectural remains of importance, and the earlier Spanish records tell of imposing temples and of worshipers in great numbers. Ruins have, been located by casual observers in various parts of the island, but little is on record up to this time. Stephens visited the site of San Miguel in 1840 and found the island entirely deserted. He examined some ruins in the vicinity but attempted nothing more. On page 373 of his Incidents of Travel in Yucatan a cut is given of a well-preserved temple of small size, located on the site of the village. Two other structures are mentioned, all of the usual type. His references to the statements of the first Spanish visitors are very interesting, and his interpretations are no doubt in the main correct. The build-

ings described by him are, however, not to be found. In front of the ruins of the ancient Spanish church of which he speaks at length there is only a shapeless mound to represent the temple at that point. Later the LePlongeons landed at the same spot, explored what remained of the ruins, and visited one or two other sites farther down the island.

RUINS AT SAN MIGUEL.—We had no expectation of making a thorough exploration of the island, as several weeks would have been required, but hoped to see sufficient of the ancient remains to determine for ourselves their character and relation to existing ruins on the mainland. It is evident from the large masses of shapeless debris in the village, and especially near the ruin of the old Catholic church, that the ancient structures were of somewhat greater importance than those seen on the islands to the north, but nothing very definite was to be learned from them. About one mile north of the village and a few hundred yards back from the shore we found the ruins of two considerable structures, one a pyramidal mass some sixty feet long by forty feet wide and twenty-five feet high, with traces of a temple on the summit, and a minute, nearly obliterated chamber with small doorway of the usual character, near the base at one end. The other is a little farther on and proved to be of very great interest, though in an advanced state of ruin. The ready-cut stone of these buildings is so much more easily utilized for fences and building purposes by the present residents than is the rock in place—though the limestones are all soft and easily quarried along the natural exposures everywhere occurring—that it is surprising to find even these remnants left.

The terrace on which the temple stands is four or five feet high,

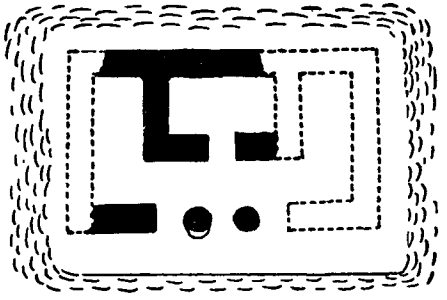


FIG. 17. GROUND PLAN OF SMALL TEMPLE AT SAN MIGUEL.
The sculptured column is at the left of the doorway.

twenty feet in length from north to south, and, as nearly as can be ascertained by present exposures, about twenty feet wide. The fac-

ing has been of hewn, or partially hewn stone, somewhat irregular in form but well laid in mortar. No trace of a stairway is visible. The temple was perhaps not over sixteen feet square, and contained an outer room or corridor ten feet in length by four in width, and two small chambers back of it, one of which was five by seven feet in horizontal dimensions—see Fig. 17. The full height of the rooms was little more than six feet; the walls are nearly two feet thick and the arches as usual are formed by the gradually approaching side-walls, held together at the top by slabs of stone forming a narrow ceiling. Small portions of the roof, constructed of stone and covered with cement, still remain.

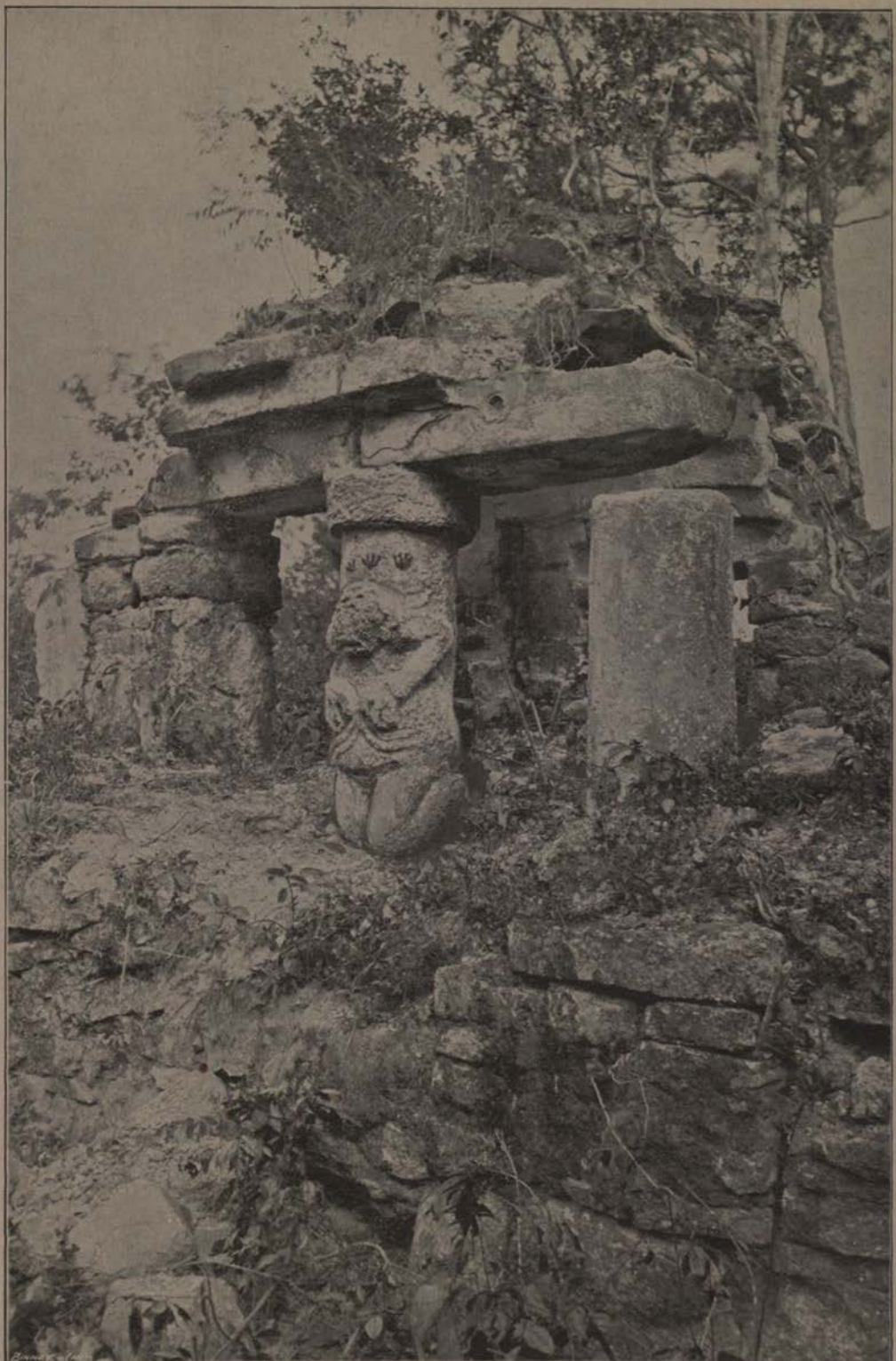
The distinguishing feature of this little temple is a remarkable column which has sculptured upon its front the large, ape-visaged figure shown in Pl. IV. This column, and another plain one at the right, divide the wide entrance to the corridor into three nearly equal openings. The sculptured figure is much weather-beaten, and apparently battered, especially about the head and face, and seems rather to have been intended for a human creature than an ape. It is represented in bold relief, or practically in the round, resting on its knees and pressing against or supporting with its back the front of the column. The hands are held in front, apparently grasping the folds of a garment. So far as I can see, no particular significance can be attached to the position. The figure is that of a female, and is possibly the only remaining representative, so far as discovered, of the idolatrous sculptures so generally cast out of the temples by the Spaniards. The figure, column and capital are all in one piece which is of the ordinary porous limestone. Originally the surface was covered with plaster and paint. In parts protected from the weather as many as six successive layers of plaster are seen, each application in turn having received a coat of red, blue or green paint, which would seem to indicate a somewhat long-continued occupancy of the building. Encircling the front of the column over the sculptured head are painted or imprinted four red hands, a feature occurring with considerable frequency in the ancient Maya structures. The lintel stones, two of which remain in place, are large and evenly cut on the exposed sides, and these and all the walls have been finished, as was the sculptured column, in plaster and washes of color.

RUINS OF CEDRAL. From the harbor of San Miguel we sailed fifteen miles down the west coast of the island and landed at a native dwelling, from which a charming walk through the forest brought us to a small village known as Cedral, three miles inland.

PL. IV. PORTAL OF A SMALL TEMPLE, ISLAND OF COZUMEL.

This building was not more than 20 feet square and 10 or 12 feet in height, and rested on a squarish terrace about 5 feet high. The portal was 4 feet 6 inches in height, and about 14 feet in width, and was divided by two round columns, one of which is plain while the other is sculptured to represent a kneeling figure, the face being much battered. Over the head are imprints of the red hand.

The stone lintels are in place, though the cap is lost from the plain column, leaving one of them only partially supported. Portions of the moldings, walls and roof remain. Photograph by E. H. Thompson.



PORTAL OF A SMALL TEMPLE, ISLAND OF COZUMEL.

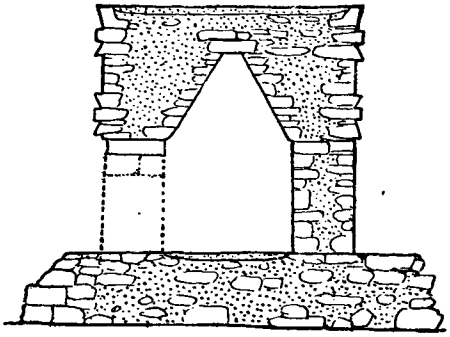


FIG. 18. SECTION OF SMALL BUILDING NEAR THE VILLAGE OF CEDRAL, COZUMEL ISLAND.

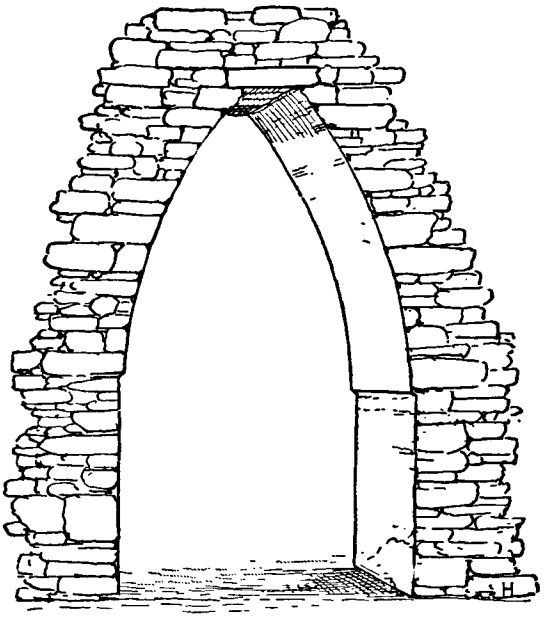


FIG. 19. ARCHWAY IN QUADRANGULAR RUIN IN THE VILLAGE OF CEDRAL, COZUMEL ISLAND.

Here two fairly well-preserved structures were encountered, while others, almost wholly destroyed by modern builders, were traceable, thus indicating an ancient occupancy of more than usual importance. In the center of the village is a small temple resembling somewhat that on Mugeres island, already described. It occupies the margin of an ancient terrace some five feet high, one hundred feet long on the front and considerably less in width. Beside it on the other margin of the terrace is the village church, a most crude, barn-like affair constructed, as are the dwellings of the people, largely of poles set on end and bound together by withes, the roof being thatched with leaves; its flimsy character is in strange contrast with the massive construction of the pre-historic temple. The ground plan of the ruin shows two oblong chambers, each about four feet six inches in width, sixteen feet in length and ten feet high. The front room is entered by a centrally placed outer doorway, now much broken down, while the inner room is reached by a second doorway directly behind the first. The interior walls are six feet high to the spring of the arch, and above this the opposite sides approach each other, reaching the ceiling stones some four feet higher. The inner door is four feet six inches high by two feet wide. The lintel stone, six inches thick and three feet long, is set back a few inches, leaving a shallow depression in the front which was plastered and is said, by the oldest inhabitant of the village, to have been covered with painted figures or glyphs. The exterior walls and roof are for the most part well preserved, and the whole construction is uniform in character with other buildings of its class.

A similar structure containing but one chamber is found about a quarter of a mile from the village. Near it and on the same broken-down terrace, which is perhaps 35 by 45 feet in horizontal dimensions and 4 feet high, are the foundations of another similar building. The standing temple or house is only 10 by 15 feet in dimensions and the single room is about 5 by 9 feet. The door, walls and arch are as usual. The section, Fig. 18, extending from front to back, indicates approximately the construction. The rather roughly laid exterior walls were plastered, and the surface varied by two bands of molding, the lower 5 feet from the ground and the upper at the top, the whole height being 10 or 11 feet.

That these pigmy buildings do not fairly and fully represent the achievements of the ancient people of Cozumel is amply proved by the remains of a group of structures encountered in the southern* margin of the village. Here we have traces of probably four buildings arranged about a court some 100 feet square. Most of the

*It is possible that the orientations here given are confused.

walls have been robbed of their facings of cut stone and only ridges of debris remain, but the fine arch shown in Fig. 19 is left, and another of like form is represented by a mere skeleton held together by matted roots of trees, the outline of the arch appearing in wood rather than in stone. The village quarrymen had but recently been at work. This latter arch is on the east side of the quadrangle, near the north end, and connects on the south with a ruined mass in which a number of round columns appear. The relation of the columns to the building cannot be determined. They are from 18 to 24 inches in diameter and stand about 7 feet apart, none being above 4 feet in height. At the northeast corner of the quadrangle and separated from it by a few feet is a ridge of debris 6 feet high by 20 feet wide and about 60 feet long, which extends to the northeast. It may represent a structure originally connected with other more completely reduced buildings encountered in this part of the village. This ridge is now being used as a stone quarry by the inhabitants.

The better preserved arch, illustrated in Fig. 19, opens through the northern tier of buildings near the west corner. It is 10 feet high to the capstones, 6 feet wide and 8 feet 10 inches through from outer to inner face. It is built largely of uncut stones and has been carefully plastered and painted. Little remains of the walls or buildings forming the southern and western sides of the quadrangle. In the court a little north of the center is a pile of debris some 4 feet high and 20 feet in diameter which, no doubt, represents a small temple or shrine. It is worthy of observation that this group of structures exhibits in general the ground plan so often seen in the more western states of Mexico.

RUINS OF EL MECO.

January 2nd was set apart for a visit to the mainland of Yucatan. The trip was about five miles across the bay to the southwest from the village of Dolores, Mugeres Island, and was made in the handy little gasoline launch. The morning's experience was rendered especially charming by the beautiful sea, which outdid itself in its marvelous transparency and display of brilliant colors. Approaching the land obliquely little was seen to break the monotony of the low-lying shore save a large clump of foliage, rising above the even forest line and marking the site of a considerable group of ruins called El Meco. Landing on a low, sandy point a little above the ruins we skirted the shore for a short distance, encountering the remains of small stone structures partly buried in the sand. Passing over the sand ridge which borders the shore, we descended into a basin-like

enclosure formerly occupied by a small lagoon, and following a slight path for one hundred yards reached the forest-covered buildings.

The central and principal structure is an imposing pyramidal pile almost wholly hidden in verdure. From the tottering walls of the summit a superb view is obtained of the iridescent waters of the bay and the islands to the east, as well as of the forest-covered plains to the west, but no glimpse could be obtained of the numerous ruins that surround the pyramid lying close to its base. This structure was so much dilapidated, and so obscured by clinging vines, that it took some time to secure a clear notion of its character. It is a stepped pyramid, about sixty feet square at the base, not including the small building at the southeast corner, and about forty feet high. It supports upon its truncated summit, which is some thirty-six by forty feet in extent, a temple fourteen feet in height and about twenty-two by thirty feet in horizontal dimensions. The temple stands back from the east margin, leaving an esplanade or terrace twelve feet wide in front, while on the other sides the projection is not nearly so great. A steep stairway ascends to the broad, eastern terrace. The temple is in an advanced state of ruin on the east front, but the side and back walls are nearly entire. The entrance was about eighteen feet wide and was divided into three openings by two round columns, now reduced to less than one half their original height. These are seen in the illustration, Fig. 20, a view of the pyramid showing it about as it would appear from the northeast with the vegetation removed. The interior is filled in to a considerable height by the debris of fallen roof and walls, so that the plan is not readily made out, but there was evidently a corridor in front, extending the full length of the building and a smaller chamber behind, entered by a door near the middle, shown in the plan, Fig. 21. Portions of the arched roof are still in place and remnants in the back room indicate a depressed, somewhat unsymmetrical, ceiling. The outer walls are separated at the corners and threaten to fall outward at an early date. They are about ten feet high above the base of the columns and retain portions of the cornice moldings, which seem to differ from the usual type in having but two members instead of three, the upper triangular member being absent, as seen in Fig. 22.

As will be seen by reference to the illustration, Fig. 20, the structure as a whole is rather clumsy and unsatisfactory in its lines and proportions. The series of monotonous terraces will be better appreciated, however, when it is observed that they were probably not a feature of the original structure, but added later for the purpose of strengthening the vertical walls of the building. A broad projection extends all around the base of the temple proper. The

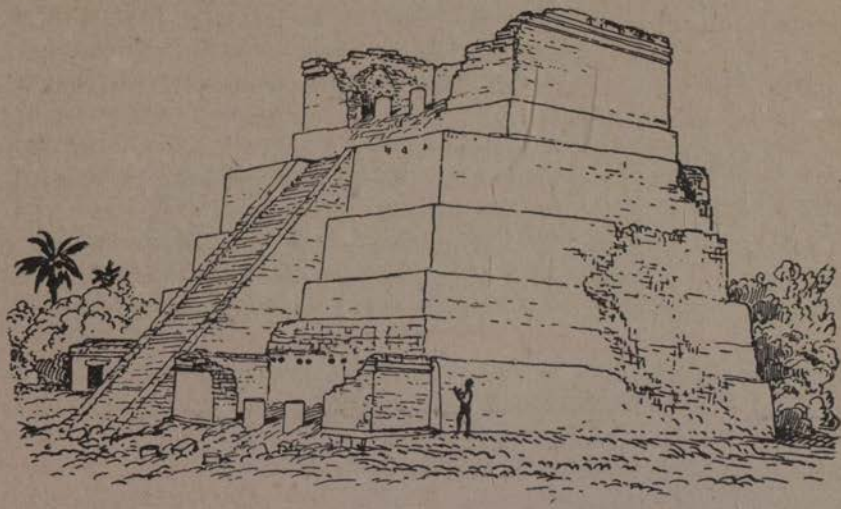


FIG. 20. PYRAMID-TEMPLE WITH TWO INFERIOR STRUCTURES AT BASE.

El Meco, mainland of Yucatan opposite Mugeres Island.

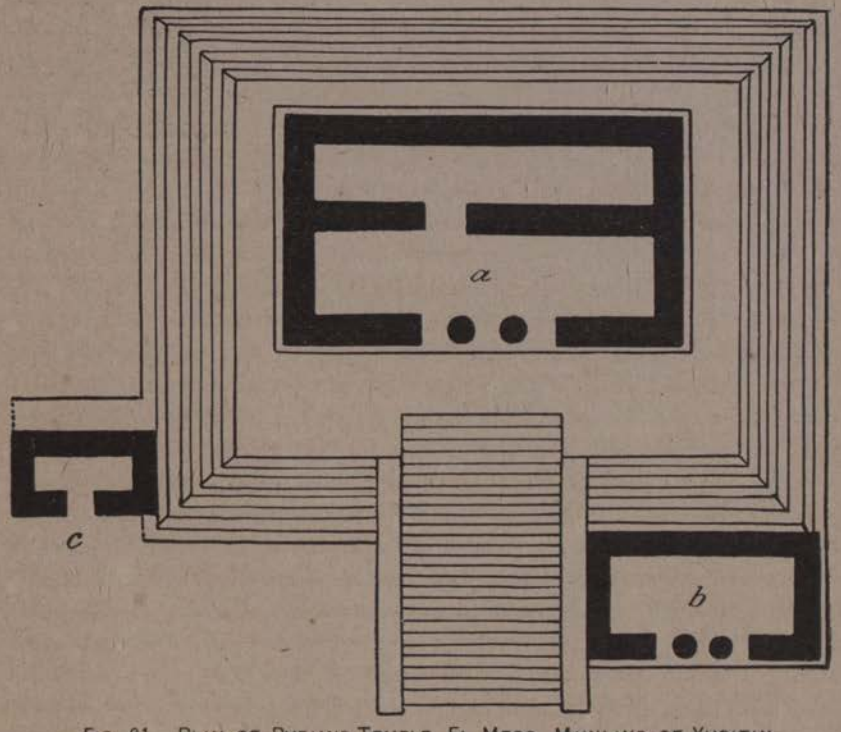


FIG. 21. PLAN OF PYRAMID-TEMPLE, EL MECO, MAINLAND OF YUCATAN.

a. Main, summit temple.
b. Lower temple.
c. Minute one-room building

exposures made by the falling away of the enclosing terraces at the northwest corner, indicate that this projection was probably the coping or upper member of the frieze of the substructure and that beneath are the other moldings and the wall extending down toward

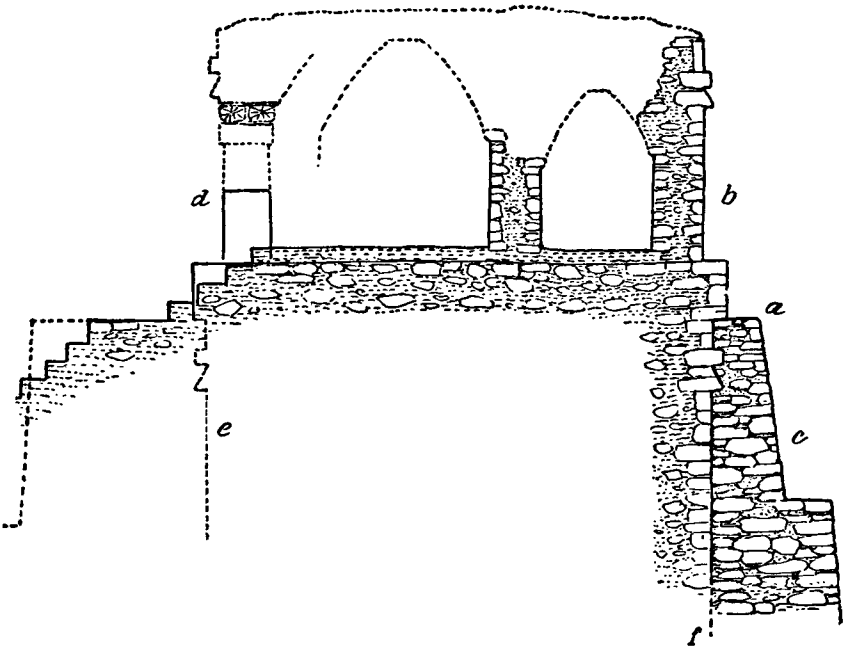


FIG 22. SECTION OF SUMMIT TEMPLE, PYRAMID OF EL MECO.

a.-c. Terraces of abutting masonry.
b.-f. Vertical wall of original structure with usual moldings.
d. Column at doorway of temple; cap and lintels restored.
e. Probable profile of original structure, eastern wall.

and possibly to the ground level. The abutting terraces were so built that the projection at *a* rested upon the upper surface of the highest terrace, thus adding to the firmness of the superstructure. The position of the opposite profile, *e*, is of course conjectural.

The casing of terraces extends entirely around the structure, save the space occupied by the stairway on the east side, and rises from the ground in four steps, the lower being about five feet high and the others about seven feet each. The terraces vary from one to two or three feet in width. The outer faces incline inward a few degrees as they ascend and are quite uneven. The masonry is crude and the stones are to a large extent unhewn and uneven, but the surface has received a coat of plaster, most of which is now removed. The stairway rises at an angle of about forty-five degrees, and the rises, and consequently the treads, are very narrow. The width is about twenty

feet and the length with the slope some thirty feet. It does not rise to the outer margin of the upper terrace, but is set into it so that the upper rise reaches the surface a few feet back of the front. A little back of this landing three or four steps, omitted in the plan, lead up between the columns into the temple corridor, an arrangement not uncommon in Eastern Yucatan.

A somewhat interesting feature of the pyramid is a temple, resembling that upon the summit, built against the base between the stairway and the northeast corner. As seen in the drawing, Fig. 20, there are two columns at the entrance, as in the summit temple; there is, however, but a single apartment, which is twenty feet long by seven feet wide. Portions of the roof masonry remain at the back, and beneath is seen a row of beam or joice holes, arranged in seven pairs; the use of the beams, if the ceiling were arched, cannot readily be made out. The probabilities are that the roof was flat and supported by seven pairs of joice timbers, as there are no traces of an arch against the stairway wall at the south end. The chamber is about six feet in height to the beam sockets. There was the usual frieze outside and the walls were neatly plastered and finished with a pale, salmon-colored paint, well preserved over the greater part of the surface.

At the southeast corner of the pyramid is a building, set back a few feet from the front, which is so minute as to have been used to confirm the myth of a pigmy people. It is thirteen feet long by eight feet wide outside and has one end set against the base of the pyramid. The doorway enters from the front and is three feet high by two feet three inches wide. The roof is still entire and the full height of the structure is a little less than seven feet. It is largely built of cut stone and was finished with the usual frieze moldings. The roof is composed of a thick coat of very hard cement, which is broken down considerably at the edges. The use of this minute apartment must remain a matter of speculation. It may have been a lodge for priest or guard, a storehouse for temple properties or supplies, or possibly a tomb, many such minute chambers having been used for the latter purpose in the pyramidal bases of temples in other parts of Mexico.

A hasty examination of the ruins which surround the pyramid indicates the existence of a partially enclosed court with the pyramid in the center. Possibly there has never been a building on the north side facing the marsh, but on the west and east sides there have been long buildings with heavy walls and rows of round columns which still stand in many cases to their full height—some six or seven feet. These columns doubtless supported the roofs of the buildings which were, in places at least, thatched, as there is not enough debris to indicate the existence of stone arches. On the south side there are a number of ruins, mostly of similar character but apparently not

symmetrically arranged, serving to enclose the court somewhat completely on that side. In front of the pyramid and twenty feet from the base of the stairway is the ruin of a small temple or shrine, like those seen on the islands, approached from the east and west by steps four or five in number. At the southeast angle of the court, and connected with the main eastern ruin, is the base of a temple with several rooms, and a stairway the sides of which were finished with serpent balustrades, the large heads resting on the ground as in some better known Yucatec examples. We were informed that other ruins are scattered through the forest, indicating a settlement of importance, but there was no time to search for them. This ruin was visited by the Le Plongeons a few years ago, but nothing has been published, so far as I have learned, save a mere mention in "Here and There in Yucatan," by Mrs. Le Plongeon.

In character and appearance El Meco does not seem to differ essentially from many similar ruins in Yucatan. The builders were doubtless one of the numerous Maya tribes that occupied the peninsula on the arrival of the Spaniards. It is remarked, however, that the buildings seem to have been of rather inferior size, construction and finish, as if the materials were less easily utilized and worked than in other places, or that the people were inferior or provincial, living beyond the immediate influence of the great culture centers. It may be noted that the front of the temple faces east, and that from the head of the stairway the little temple on the southern end of Mugeres island is distinctly in view. The stone used in construction was probably obtained from the immediate vicinity, and was very largely of uncut masses and fragments set in mortar and evened up by plastering. Considerable cut stone was used in cornices, corners of walls, door facings, lintels, stairways, and especially in the numerous round columns. These latter were often composed of a single piece twenty to twenty-four inches in diameter and six or seven feet in length. Their presence implies rather extensive quarrying of the limestone in place, as loose masses of surface rock of large size must have been rather rare along this low-lying shore. A few other ruins of considerable importance are reported along the eastern shore, and others are scattered over the interior regions, but no group of remains of first-class importance has been reported in the northeastern angle of the peninsula.

RUINS OF TULOOM.

The most important group of ruins on the east coast of Yucatan, so far as the remains have been reported, is that known as Tuloom. It is situated on a high bluff overlooking the sea, some twenty-five miles southwest of San Miguel, the main settlement of the island of Cozumel. It was visited by Stephens in 1840, and he has given us the only available account* published up to date. This place must have been an important stronghold of the ancient Mayas, although it was not visited by the early Spaniards so far as our records show. It is a remarkable circumstance that this place is held to-day by a Maya tribe which has never been permanently subdued by the Spaniards or Mexicans, and which now holds it as an outpost, being at war with the Mexican Government and with all intruders whatsoever their nationality. At the time of our visit to Cozumel there were special symptoms of hostility, and the sub-chief, to whom the Tuloom district was intrusted by the principal chief, whose headquarters are some distance inland, had recently been summarily executed for permitting trade between his people and the inhabitants of Cozumel. It was natural, therefore, when the leading citizen of Cozumel, Don Pedro Perez, assured us that we would certainly be fired upon by the hostiles if we attempted to land, that the project of studying this ruin was abandoned. As the sail across the bay from the southern point of Cozumel, where we had work to do, was such a short one, we decided to take a look at the ruin from the sea, and were well repaid for the few hours consumed in the trip. The accompanying sketch, Fig. 23, made from the deck of the Ituna, will give a somewhat vivid idea of the remarkable ruin and its novel and picturesque situation.

As we sailed to the southward, keeping as near the shore as the depth of the water would permit, the low line of bluffs increased in boldness and we soon came in sight of a series of somewhat isolated ruins whose light-colored walls were clearly defined against the dark-green forest of the seaward slopes. At the left was Tuloom, Fig. 23. The promontory on which it stands comes well forward into the sea. Rising to a height, in places, of perhaps one hundred feet, is an irregular bluff deeply scarified and undercut by the sea. In other places it is lower, and to the north and south it disappears. The rock seems to be the same massive, brownish, porous limestone, encountered elsewhere along this coast, and breaks down in great irregular masses which lie at the base of the cliff until eaten up by the waves. From the crest of the cliff a steep, wooded slope reaches back and up one hundred feet or more to the upland. Midway in this slope and partly

* Stephens' Incidents of Travel in Yucatan, Vol. I, p. 390.

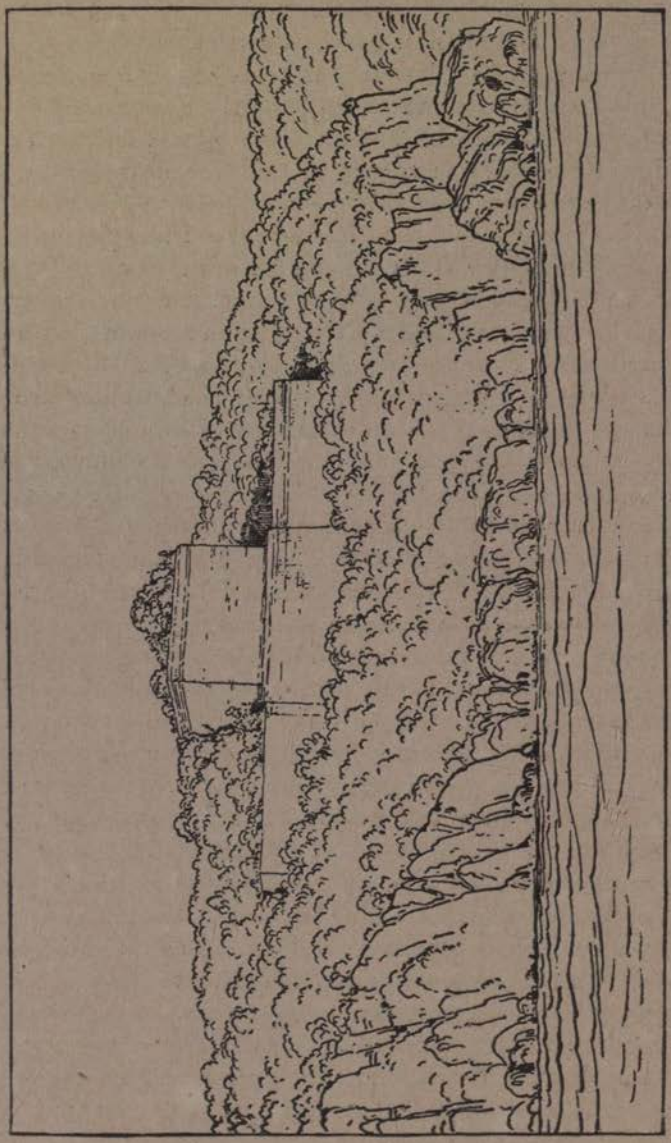


FIG. 23. RUINS OF TULOOM AS SEEN FROM THE SEA.

The building fronts inland and the outer walls are without doors or windows.

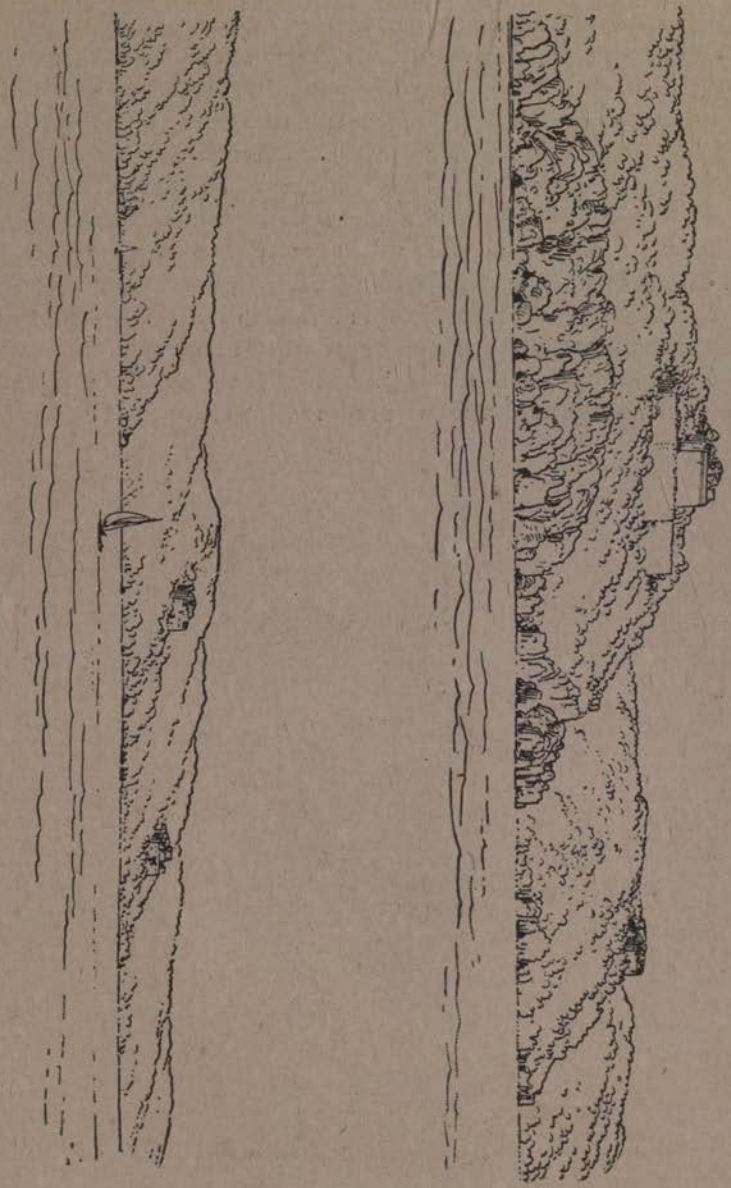


FIG. 24. PANORAMA OF TULOOM AND THE SHORE TO THE NORTH. SKETCHED FROM THE YACHT.

buried in the forest is the main ruin of Tuloom. The building faces inward and the broad outer walls, which are all that can be seen from the water, are extremely monotonous, being without doors or windows, and without decoration save perhaps the cornice moldings, which were, however, not clearly made out. The central building appears to have two stories, the lower having wings of equal height projecting at the right and left. The central structure is squarish in form and well preserved, and is crowned by a pyramid of vegetation which flourishes upon the roof. This is the temple described and illustrated by Stephens. We were extremely loth to turn our backs upon these monuments without a closer view, for they evidently represent the most important Maya city east of Chichen-Itza. Occupying corresponding, though less prominent situations in the face of the seaward slopes, are three other ruins, apparently all important structures, one appearing upon the bluff next north of Tuloom, and the other two, rather close together, a mile or more up the shore.

A MUGERES COLUMN, ISLAND OF COZUMEL.

RUINS OF MIDDLE NORTHERN YUCATAN.

MOUNDS AT PROGRESO.

The geological history of Yucatan has been but little studied. The exposed formations are all of comparatively recent age as indicated by the fossil remains which represent mainly late pliocene or early pleistocene forms, many species being identical with those now living along the shores. The physical characters of the surface are peculiar and serve also to indicate a recent elevation of the land area above the sea level. The northern margin of the peninsula is very low, the strata sloping at a gentle angle to the north and passing gradually beneath the sea. The coasts consequently exhibit few outcrops of the rock, and are bordered by sand-bars enclosing narrow, marginal lagoons. At Progreso the lagoon is a salt marsh, now gradually filling up, so that the space will soon be permanently added to the land area. The face of the country is composed of rough-surfaced beds of limestone only partly covered with soil, and at Merida, twenty-five miles inland, the elevation is only twenty-five or thirty feet above the sea.

Progreso is built on a sand bar rising ten or twelve feet above high tide. The spot appears to have been extensively occupied by the ancient peoples, and a number of low mounds composed of midden refuse and the debris of habitations are still to be seen about the outskirts of the village. Just back of the railway station and on the edge of the marsh are two of these mounds, each several hundred feet in horizontal extent and rising to a height of five or six feet. They are composed largely of dark earth, which is filled with countless sea shells—the kitchen refuse of a community that must have subsisted very largely upon the products of the sea. There are also great quantities of earthenware displaying all the varieties of material, shape and decoration characterizing the ancient Maya work. There are stone implements as well, which include hammerstones, sledges and objects of flaked flint and limestone.

Just beyond the western limits of the village of Progreso there are other mounds of like character and contents, and, indeed, it may be said that such occur all along the northern shores of Yucatan. Not only are the coast lines supplied with these and analogous re-

mains, but the whole surface of the country is dotted with mounds and pyramids, many of which are visible in the fields from railway trains and roads. A few only have been visited by students, while thousands of others, hardly inferior in interest, have been passed by and remain today untouched save by the plow, the quarryman's sledge or the pick of the treasure hunter.

The capital of Yucatan, Merida, is situated on the site of the ancient city of Tiho, and there may still be seen one great mound and a number of low ones that represent ancient pyramids and temples. It is interesting to note that the dwelling of our archeologist associate, Mr. Thompson, is located upon one of these tumuli.

UXMAL.

From Merida the trip to Uxmal is made by rail south to Tikul thirty-five miles, and thence by *volan coche* over rocky plains and across a low range of limestone hills twenty miles to the westward. It may seem incomprehensible that a student of American antiquities should limit his visit to one of the grandest groups of remains on the continent to a single day. Having made a long and in large part a disagreeable journey, it was indeed hard to have to return after taking a mere glance at the wonderful structures, but it was considered dangerous on account of the deadly miasma of the locality to remain long at the hacienda. Few strangers have the temerity to make a prolonged visit, and our companion, Mr. Thompson, having spent a few weeks here preparing models for the Chicago Exposition, knew by painful experience the dire results. Strangers are, of course, especially subject to the febrile influences, but so deadly are the poisons that it is said no child born on the hacienda has ever survived to grow up there.

The time spent at this place by our party was, therefore, not sufficient to permit more than a most superficial examination of the extensive remains, but many sketches and photographs were obtained. Descriptions already in print are more detailed than I can undertake to give, and it seems that the only way in which I can add materially to the body of published data relating to the ruined city, is to prepare a panoramic sketch and accompany it with brief descriptions, thus presenting in a single view all the important features of the site, and furnishing a key to the ruins easily utilized and sufficiently detailed for the ordinary reader or even for the student who desires to acquire quickly a comprehensive idea of the group.

The country is for the most part a great forest covered plain, and the horizon is everywhere as level as the sea, save where broken on the east by a range of hills crossed on our way from Tikul and not seen in the sketch. Like the most of northern Yucatan, this locality has some of the characters of a desert, for there are no streams or springs. In ancient times the water supply was furnished by cisterns within the city, or by pools of water some distance to the west, which are now filled up, save in the wet season, with soil and vegetation, and give forth the death-dealing poisons for which the district is notorious.

The area covered by the main group of ruins is not large, probably not much more than half a mile square, but scattered remains are found beyond this limit, and the place when inhabited must have been extensive and important, and no doubt presented a brilliant and imposing effect. Though the buildings are now much dismantled and buried in deep forest save where recent clearings have been made, they are still impressive in the extreme, and it is difficult to realize that the huge pyramidal masses, rising like hills above the general level, are really wholly artificial. It is believed by some that Uxmal is the most important ruined city in Yucatan, but it has a great rival in Chichen-Itza, and it may not have surpassed in grandeur several other cities not now in an equal state of preservation.

There are five great structures or groups of structures that take high rank as specimens of Maya architecture. These are the Pyramid-temple of the Magician, the quadrangle called the Nunnery, the House of the Turtles, the House of the Pigeons and the Governor's Palace. They are surrounded by as many more, less in interest and importance only because they are in a more advanced stage of ruin. In order to present a clear and comprehensive panorama, the point of view assumed is considerably above and to the north of the quadrangle of the nuns. This point is at X on the accompanying map which is placed with the south at the top to make it accord better in position with the panorama. This map is based largely on that of Stephens and is far from satisfactory, but it will serve to give an idea of the eccentric placing of the buildings and their relative dimensions, as well as to show some details of their ground plans. In the drawing the spectator is facing the south and has the hacienda at his back nearly a mile away; the timber has as far as possible been omitted. Great detail is not attempted as photographic illustrations of individual structures must be relied upon for special studies, but a good general notion of the group is, I believe, secured. Few measurements were taken, and those given, derived from various sources, cannot as a rule assume to be more than approximations, but they serve

general descriptive purposes quite well. It is seen at a glance that the buildings are irregularly placed, none of them being exactly orientated, and few stand in identical relations with the points of the compass.

In the foreground at the left is the Pyramid-temple of the Magician, A, with its small court at the right hand base. Connecting immediately with this is the Nunnery quadrangle, B, occupying the greater part of the foreground. Behind the latter, on the ground level, are two massive ruined walls usually referred to as the Gymnasium, C, and rising behind this is a great triple terrace, on the second level of which, at the right, is the House of the Turtles, D, and crowning the summit is the Governor's Palace, E. To the right and beyond is the serrated crest of the House of the Pigeons, F, overshadowed on the left by the massive pyramid, G, and backed up by a temple-crowned pyramidal pile of inferior dimensions, H. To the left of the House of the Governor and beyond is a group consisting of two pyramids, I, and on the right of the Nunnery quadrangle, and some distance farther away, are other ruined masses, one only coming fully within the limits of the picture.

Certain features of material, construction, plan, elevation and ornament are common to all, or nearly all, of the buildings, and these may be reviewed at the outset and largely omitted in the descriptions of particular buildings. The stone used is the pale yellowish and reddish-gray, obscurely marbled limestone of the locality, and was extensively quarried from the massive beds somewhere in the vicinity, the sites, buried in the dense jungles and obscured by debris, being necessarily hard to find. No one has undertaken to locate these quarries which will, no doubt, be found to exhibit all the usual phenomena of stone-age manipulation. The body or hearting of the walls and mounds is constructed of fragmental stone set in a liberal matrix of whitish mortar of excellent quality, made of lime burned in the vicinity. The facings and ornaments are all cut and sculptured with a masterly handling not surpassed where chisels, picks and hammers of iron and steel are used, and the faces and contact margins are hewn with perfect precision. Though the finish of the surfaces was often secured by means of abrasion or grinding, picking or pecking were the main agencies employed, and the indents of the tool are often apparent and wonderfully fresh looking. The stones were set in mortar, although in many cases the joints are so perfect that the mortar does not appear on the surface.

The sections presented in Figs. 25 and 26 indicate the average construction. Much plastering was done and nearly all surfaces, and apparently even the multiferous details of moldings and sculptures,

were evened up with white plaster in the most painstaking manner and finished in colors of several hues. The walls are thick, averaging perhaps three feet, but extend in one case to nine feet, and are approximately vertical on the exterior to the full height, and on the interior to the spring of the arch. Outer faces are little broken by recesses and projections, and are only saved from monotony by their elaborate ornamentation. Usually they are divided nearly midway, by rigid moldings of prevailing type, into an upper and a lower zone, the latter being almost always faced with plain cut stone, save a narrow band of ornament at the base, and the former—a development of the entablature—is elaborately decorated with composite sculptures, and bordered above by the usual heavy band of moldings.

The course of shoe-shaped coping stones served in all cases to retain the level, cement floor of the roof. The corners of the buildings are square or rounded. There are no windows or other openings for air or light. The doorways are confined to the lower or plain zone of the wall space and are simple in construction and finish and of medium or large size. They occur singly, the great portals with columns not being seen in Uxmal. The jambs are faced with cut stone like that of the walls, and the longer lintels are or were of zapote wood dressed square or partially squared, averaging perhaps fifteen inches wide, twelve high and eight feet long. Many are well preserved to-day, especially where protected from the weather, and some were covered with inscriptions.

The plan of the buildings usually takes the form of a long, narrow rectangle, having one or two ranges of rooms, generally the latter, and it may be said that, as a rule, there is an assemblage of these structures in groups of four about a court, forming a quadrangle. The squarish temples, with specialized plan, characteristic of Chichen-Itza, are rare or absent. None of the buildings are over one story in height, though the roof crests in some cases give the effect of great elevation. Nearly all are built on terraces or pyramids which assume a great variety of ground plan and profile.

The apartments are all of good size and height, and the vaulted ceilings are formed of the usual wedge-shaped arch constructed of horizontally placed stones corbelled and bevelled with the slope. The capstones, the connecting stones of the vault, are exposed to a width of from twelve to twenty-four inches. The interior walls are without features of interest save numerous beam holes, and dumb-sheave cord-holders for attaching doors or hangings. Stairways were numerous, wide, well built of cut stone, and generally steep. A very common feature of the courts is a standing stone or *picote*, as the Spanish say, believing them to be whipping posts, and phallic emblems occur in many places.

TEMPLE OF THE MAGICIAN. This temple may well be regarded as amongst the most notable ruins in the group, and is first to catch the eye of the visitor who approaches by the roadway. It stands at the left in the foreground of the panorama, the north end facing the observer. The steep pyramid supports upon its summit a ruined building, and upon the western face, near the top, is a second structure of remarkable position and appearance. The height of the pile is upward of eighty feet, the length at the base about two hundred and forty feet, and the width nearly one hundred and sixty feet. The ends seem to be somewhat rounded, as seen in the plan, a novel feature in structures of this class. The summit platform measures about twenty-two by eighty feet. The interior of the mass is composed of stones of varied shape and size imbedded in coarse mortar, and the surface was faced with rough-dressed stone, large portions of which are still in place. A wide stairway, not in view in the drawing, rises directly from the roadway on the east side at an angle so steep that the ascent is made with difficulty and at no little risk. The steps are constructed of smallish, rather roughly hewn stones, originally well laid in mortar, and probably evened up with mortar, but now much loosened and displaced, though the stairway is, as a whole, still in a wonderful state of preservation considering the steep angle, and the many destructive agencies that have been at work upon it for upward of four hundred years. The platform is narrow and shows vertical faces of hewn stone extending down into the mass of abutting masonry. The temple which crowns the summit is some seventy feet long by twelve feet wide, and contains three rooms, the middle one being longer than the others. The arch-supported roof has fallen in, and the walls are broken down wherever there were doorways. The end wall at the north is completely destroyed, while that at the south end is nearly entire. The east façade, about one-third of which remains, has been comparatively plain, but the west face, seen at the right in the sketch, though broken down in the center, evidently presented a most attractive appearance. Extending around the base of the wall, save for a short distance along the north front, is a band of columnar ornament. Above this is the lower wall-zone, plain at the outer ends, and exhibiting neat and chastely embellished lattice-work panels next the broken-out doorway. The upper space is rather narrow, and is decorated with four panels filled with unique sculptures, the upper member in each being a mask of rare form. The center over-door piece has probably been elaborate and handsome. The medial and cornice moldings are of the usual type. The whole height of the building is about sixteen feet.

The most striking and unique feature of the structure is a temple

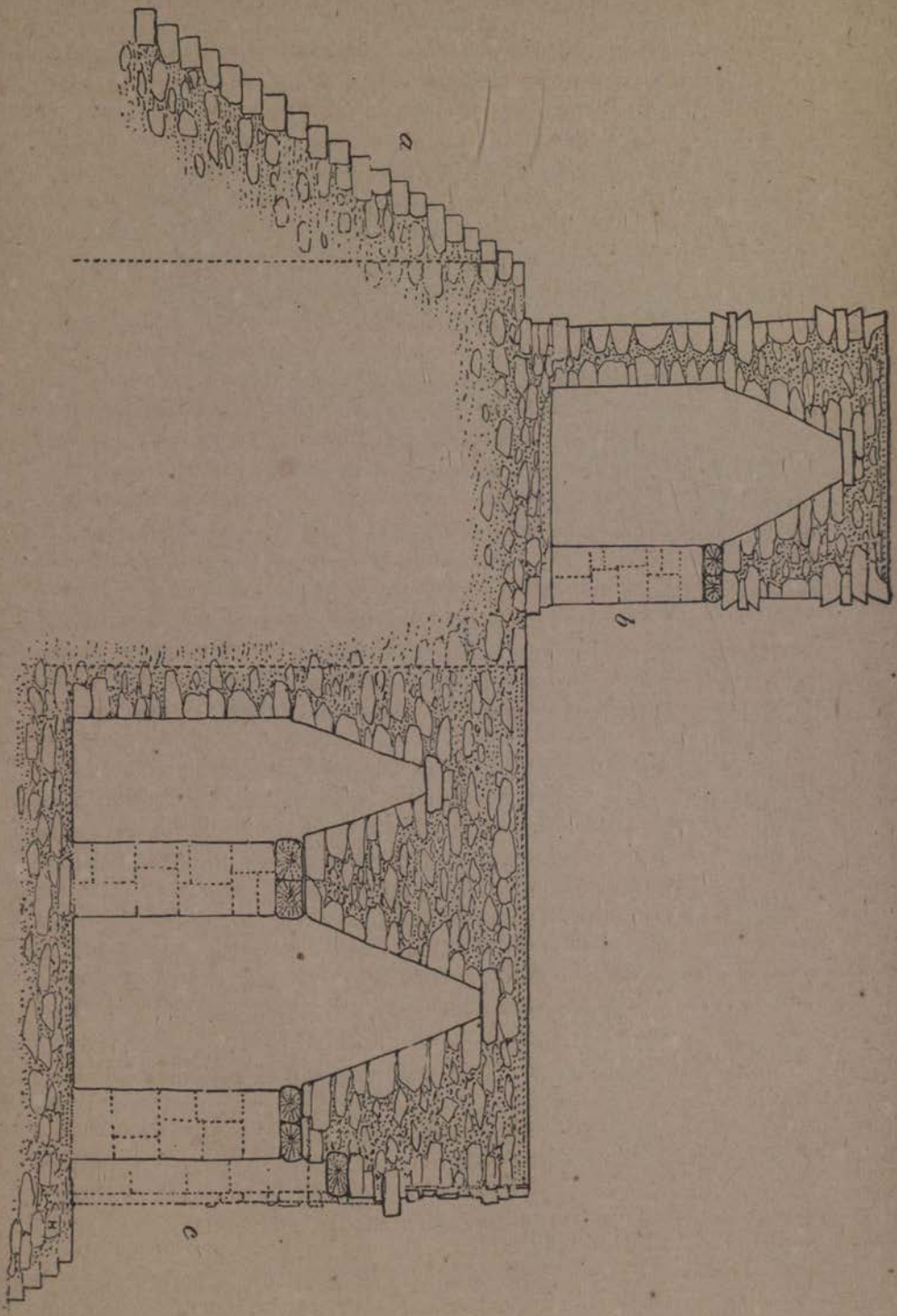


FIG. 25. SECTION OF UPPER AND LOWER TEMPLES. HOUSE OF THE MAGICIAN, UXMAL.

built against the north side of the pyramid, and having its roof on a level with the crest of the pyramid. The doorway opens on a narrow platform from which a stairway, some twenty-four feet wide, the body of which still remains, descended into the court below. The façade of this temple is about twenty-two feet square and is a most ornate and vigorous piece of composite sculpture. The large space above the doorway is occupied by a colossal snouted face or mask some twelve feet square, worked out in a wonderful manner and filled with striking and unusual details, the principal of which—probably a life-size statue standing on the snout and resting against the forehead—is lost; others are a pair of tigers, placed together with outward turned heads, supporting the pedestal of the statue, and groups of devices, resembling glyphs, forming the cheeks of the mask. The corner decorations comprise smaller masks, seven in each tier, built up, as in other cases, of numerous sculptured stones, and the sides connecting the façade with the sloping face of the pyramid are also elaborately treated. The exterior wall surfaces of this temple is thus entirely covered with these ornaments—a rather unique occurrence in Maya architecture. The interior is entered through a doorway of noble dimensions and style, and consists of two plain, oblong chambers, one behind the other, arched as usual. Pilasters are placed at the sides of the doorway, and the lintel consists of three strong beams of zapote wood. The accompanying section, Fig. 25, will assist in understanding the construction of these and other features of the monument.*

The nature and construction of the lower slope of the pyramid on the west side were not made out. The stairway may have been interrupted by other buildings, but this is unlikely. Low down on the slope are the remains of several small chambers which may have served as tombs. The rather small court occupies the space between the base of the pyramid and the eastern wall of the Nunnery Quadrangle, and though not very well defined, appears to have been enclosed by buildings somewhat as in the well-preserved quadrangles. The House of the Birds, described and illustrated by Stephens, is in this cluster.

NUNNERY QUADRANGLE. This famous group of buildings is among the best known specimens of Maya architecture, but much as it has been described, and as fully as it has been illustrated by the drawings of Catherwood, the photographs of Charnay and Le Plongeon, and the photographs and casts of Thompson, the student must see it before he can begin to realize its marvels. Four great rectangular struct-

*This section was made out from hasty observations and is probably defective in details. The upper doorway is restored. The long dotted lines are intended to indicate probable vertical wall faces.

ures, low, heavy, and formal in general conformation, stand upon a broad terrace in quadrangular arrangement, their ornate fronts facing inward upon the inclosed court. This assemblage of massive structures of stone presents at first glance the appearance of a fortification, but closer examination does not bear out the impression. The buildings stand apart at the corners, leaving wide passageways into the court, and though three of them present unbroken exterior walls, the fourth, on the south side, has exterior doorways, and a grand archway, ten feet wide and fifteen feet high, leading through the center of the building to the court, as seen in the panorama. The defensive motive seems to have had no part in the design, and we have merely a convenient assemblage of four independent buildings, intended for a common use or for kindred purposes. Though built, no doubt, at somewhat different periods of time, they are much alike in plan, construction and general effect. They do not have the character of temples but rather of communal dwellings or residences for bodies of priestly or other sacerdotal orders.

In the panoramic sketch we look down upon the great quadrangle from the north, the exterior wall (of which few details were secured) and the broken roof of the north building appearing in the immediate foreground. The serrate crest, at the farther side of this mass, is a back view of the lofty, highly ornate, though much broken façade. At the left is the east building with its flat roof and its fine façade much foreshortened. Beyond we see the inner front of the south building with its dark archway, and to the right is sketched in the wonderful entwined feathered-serpent façade of the west building.

The terrace upon which these buildings are somewhat unsymmetrically placed has not been very clearly defined. The base measures upwards of 300 feet square; on the south it rises in three unequal steps to a height of perhaps fifteen feet; on the other sides, and especially at the north, the height is considerably greater. The plans of the four buildings are rather imperfectly indicated on the accompanying map, and two small structures, much ruined, appear within the court near the north side. Between the latter a wide stairway ascends to the esplanade of the north building. The state of preservation of the buildings is pretty well shown in the panorama.

The four great façades facing the court are among the most notable in Yucatan, and deserve especial attention at the hands of students of American art. They have been carefully described by several authors, however, and require but brief mention here. Bancroft's descriptions are especially full and lucid. Though presenting a somewhat varied appearance, these buildings are essentially alike in plan, elevation and construction. The differences are mainly in the

decorative treatment, though even in this respect they have many characters and features in common. In all cases the lower wall-zone is plain and the upper almost wholly covered with sculptures. In the south and west buildings the façades appear to have terminated above with the coping. The east building shows the remnant of a centerpiece that rose slightly above the cornice, and the north façade had an elaborate false front covered with sculpture and rising in a dozen or more pinnacles or gables of varying height.*

Examining the various motives employed in embellishment we find that the great snouted mask† was the favorite and is found in all the fronts. It differs in each case, however, and reaches extraordinary elaboration of detail in the north building, where it formed vertical tiers five or six faces deep at the corners and over alternate doorways, rising in each case to the crest of a façade pinnacle. The mask was also used in inferior pinnacles rising from the coping over the remaining doorways.

In the east building there are vertical tiers of similar faces at each corner, and one corresponding line in the middle of the front. One column of three superposed masks is preserved in the west building. Toward the left there were probably two others, the middle one possibly having superior height and prominence. The corners were no doubt ornamented in like manner. The south façade has masks, of somewhat different detail, associated with the coping over each doorway, as indicated in the panorama.

Next to the mask design the most important motive is the serpent, which appears in the east, west and north fronts. The embodiment of the colossal feathered serpent with the complex field of geometric decoration in the west façade is a most effective piece of work and must be regarded as a great masterpiece of decorative sculpture. Early explorers state that they found the façade almost complete, but nothing is said about the number of serpents included. Judging by the pretty general consistency of native design, I should incline to question the view taken by Bancroft, that the serpents inclosing the right and left panels — portions of which are still in place — are intertwined with endless serpent bodies inclosing the center panels. We should rather expect to find that there had been two pairs of serpents, the inner member of each pair facing some important, symbolic centerpiece occupying the middle of the façade. This would properly fill the spaces of the building and give consistency to the design. The "nearly intact" of the first observers may leave room for a considerable gap in the façade.

*Charnay, Ancient Cities of the New World, p. 400.

†I have usually spoken of these snouted visages as masks. If not masks, they are at least partially masked faces, and probably symbolize the chief Yucatec deity, Cukulcan.

In the front of the eastern building four over-door V-shaped trophy-like ornaments are seen, each consisting of eight horizontally placed, two-headed serpents with bar-like bodies, and against these are set in each case near the top a colossal human head with peculiar and elaborate head-dress. Over the centerpiece of the façade is a somewhat similar arrangement of serpents, rising through and above the coping and effectively breaking the otherwise monotonous line.

In the north front the same conventional serpent* occurs in pairs and in varied forms in roof decorations of the over-door *calli* ornaments. This miniature *calli* or house takes third rank among the ideographic motives employed. It forms the over-lintel ornament in all cases in the south building, and is found over alternate doorways in the north building. It is in high relief, and it is said that originally seated human figures occupied some or all of the doorways. Life-sized or colossal human figures, almost in the round, form a fourth group of motives. They were set in various situations as centerpieces in the decorated fields, and several fragments remain to attest the skill and taste of the ambitious builders. The aproned shield placed at intervals along the frieze molding forms a fifth class of decorative elements.

The ground or field of the decorated spaces in all cases is the sculptured lattice work, and associated with it in three of the façades are fine, boldly drawn mosaic fret units. An important feature of the façade embellishment are the bands of miniature columns introduced at the base and in the medial and cornice moldings.

It may thus be said that these buildings employ, almost in common, some eight or ten distinct decorative elements, nearly all of which are doubtless mytho-æsthetic, and were introduced because of their associated ideas as well as for embellishment. They all occur in other buildings in Uxmal, and nearly all are found in one form or other, and often with identical treatment, in Chichen and other cities of Yucatan.

The treatment of the end and rear walls of these buildings, so far as I have learned, is comparatively simple, consisting in the main, aside from the mask-decorated corner pieces, of alternating panels of plain wall and lattice work. Human figures in high relief and phallic symbols occur on the exterior wall of the north building, but sketches of these features, kindly forwarded to me by Mr. E. H. Thompson, unfortunately came too late to be utilized in the panorama. The interiors are generally plain with plastered or partially plastered masonry, the lintels and jambs of the eastern building alone being embellished.

*Possibly the term monster would be better, as it is not quite certain for what kind of creature the figures are intended.

It is a noteworthy fact and one tending to indicate a very considerable antiquity for this group of structures, that the north building is built over and includes within its walls the ruin of an older structure, which is, however, so far as can be seen, of like character and ornamentation.

THE GYMNASIUM WALLS. Over the center of the south building of the Nunnery in the panorama, and midway between this building and the House of the Turtles, are two massive walls or oblong piles of masonry much foreshortened by their position. They appear to be the only structures built directly upon the general level of the site, though it may not be entirely amiss to regard them as substructures intended to support audience places or temples, as in the Tennis Court of Chichen. The presence of remnants of sculptured serpents about the base of one of the walls would seem to indicate that a stairway and, therefore, probably a superstructure, formerly existed. The presence of large stone rings set in the walls on opposing sides is generally regarded as indicating the use of the space between as a ball ground. The length is given by Stephens as ninety feet, the height twenty feet, and the thickness of each wall twenty feet.

THE GOVERNOR'S PALACE. Beyond the Ball-court walls, as seen in the panorama, rises the broad, triple terrace of the so-called Governor's House or Palace. The superb building crowning the summit is justly regarded as the most important single structure of its class in Yucatan, and for that matter in America. It is extremely simple in plan and outline, being a trapezoidal mass some 320 feet long, forty feet wide, and twenty-five or twenty-six feet high. It is partially separated into three parts, a long middle section and two shorter end sections, by recesses leading to two great transverse archways now walled up, but formerly passing quite through the mass.

The building faces the east, the back appearing in the panoramic view. The front wall is pierced by nine principal doorways, now much broken down above, and by the two archway openings, and presents a façade of rare beauty and great originality.* The back or west wall is unbroken, save by the two archway recesses and a recent breach in the surface masonry. It is nine feet thick below throughout nearly the whole length, and increases to twelve or thirteen feet at the level of the capstones of the interior arches, as shown in the accompanying section, Fig. 26. The arrangement of rooms and doorways is perhaps sufficiently indicated on the map which accompanies the panorama. The width of the rooms is limited by the span of the wedge-shaped arch, which rarely exceeds ten or twelve feet, but the

*The finest illustration of this building yet produced is that published by Charnay, Ancient Cities, etc Plate opposite p. 394.

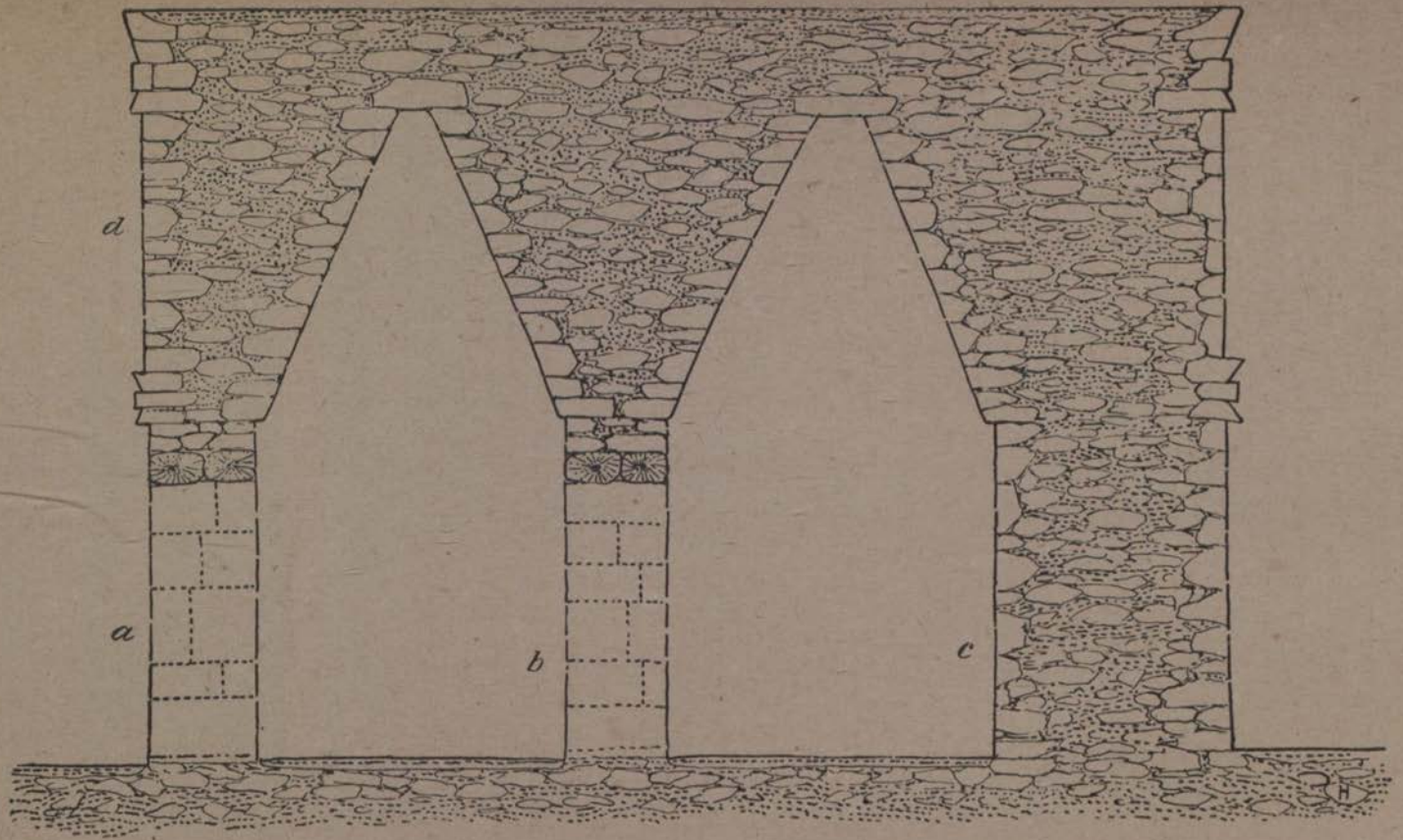


FIG. 26 TRANSVERSE SECTION OF GOVERNOR'S PALACE, UXMAL.

a. Outer doorway, wood lintels restored.
b. Inner doorway.
c. Back wall, 9 feet thick.
d. Entablature zone containing rich decorations.

length reaches sixty feet in two cases. The interior body or hearting of the walls is built of rough stones and mortar, and so well laid up that often where the casing stones have fallen, the exposed face presents the appearance of an ordinary rubble wall. It should be remarked, however, that the larger exposed faces, seen in the main façades, do not appear to represent the actual backing or bed of the facing courses, but rather the back of the soffit of the chamber vaults, as indicated by the pitch of the exposed spaces, the whole of the hearting of the wall having slid off.

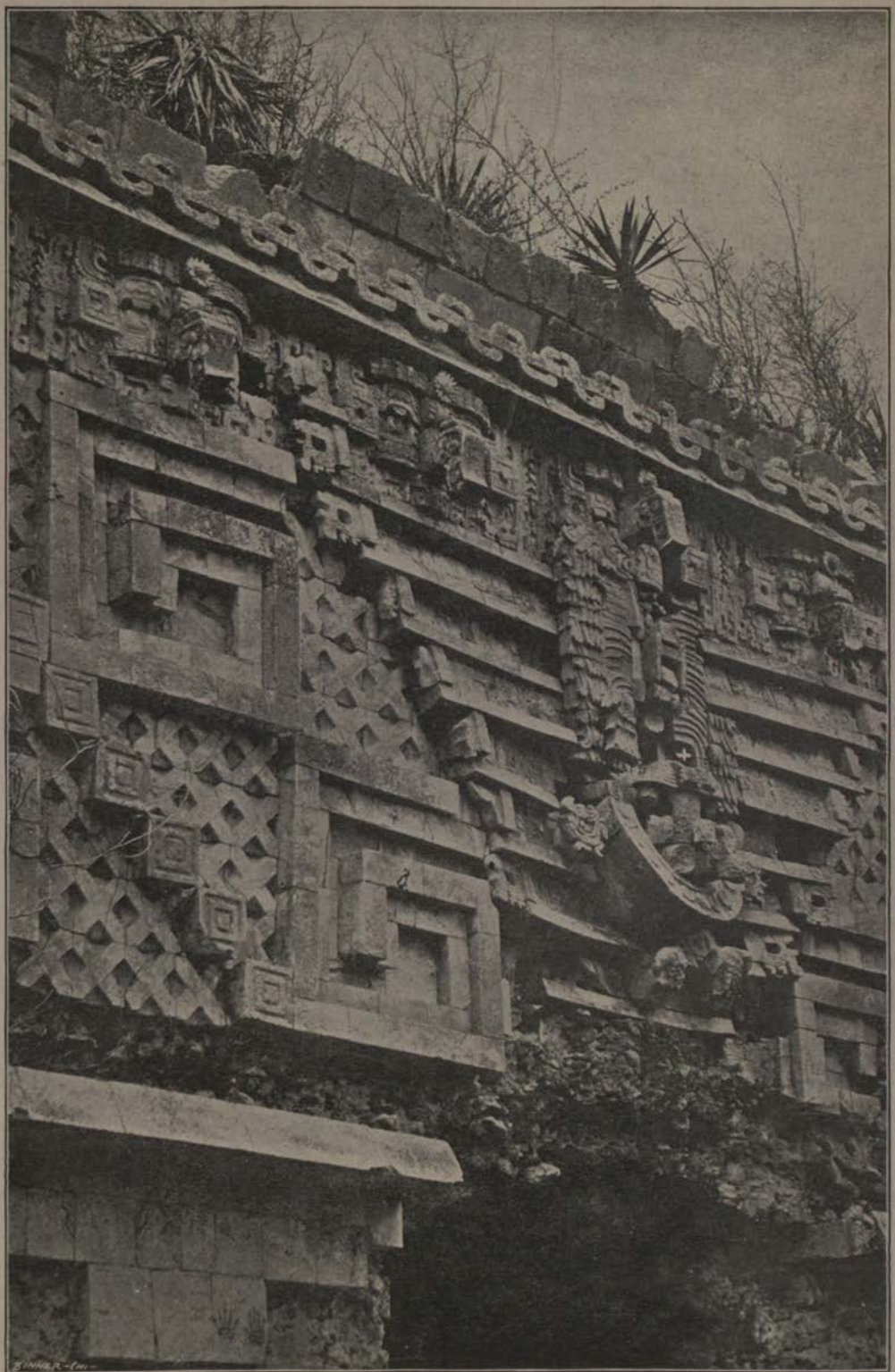
The facing of the walls within and without is of the usual light, warm gray limestone in large squarish blocks, cut and laid, in the main, with nice precision. The exterior wall surface is about twenty-six feet in height and is divided into the usual lower and upper zones, the former being only a little more than half as wide as the latter. The lower is quite plain, save a narrow band of columnar ornament at the base, and is perforated by the doorways which, through the loss of their wooden lintels, have fallen in above, leaving wide, ragged arches penetrating considerably into the upper decorated area, thus mutilating some handsome over-door ornaments.

The upper zone is bordered below by the usual bold, triple membered molding, and above by a frieze of ornamented molding which is capped with a wide, flaring, coping course, plain, save over the western gateways, where it is elaborated into a series of grotesque masks. The included zone of sculptures is about ten feet wide and extends entirely around the building. It is, therefore, 720 feet long and includes in its ornamentation, by moderate estimate, 20,000 stones, nearly all of which are sculptured and individual in shape. The setting of the complex designs, with their recessings and projections, is a masterly piece of masonry, though there is, strange to say, in all the work an apparent lack of appreciation of two of the most fundamental principles of stone laying, the transverse bond and the systematic breaking of joints.

There are three principal motives, the mask, the fret, and the lattice, employed in the design, which is elaborate and systematic but greatly diversified in effect. The leading feature is a double band of current fretwork of colossal size, set upon a ground of latticework. This occupies the lower seven or eight feet of the space and is accompanied above by a line of snouted masks in the usual style. This line is not carried continuously along the upper border, but, as if to avoid too great formality, breaks down over the geometric field near the outer angles of the façade, connecting with the lower end of the corner ornaments, which consist of the same mask element. Special designs occur over doorways and at the corners, and at intervals on

PL. V. PORTION OF SCULPTURED FACADE, GOVERNOR'S PALACE.

This very handsome and elaborate piece of work is a section of the embellished entablature-zone of the Palace. The height from the lower or medial molding below to the coping course above is about 10 feet. The entire length, covering the four walls of the building, is some 725 feet. If we allow that the stones employed average 6 by 12 inches in surface dimensions, this deeply coffered and relieved mosaic would comprise upwards of 20,000 pieces, all especially cut and a large percentage elaborately sculptured. Two plain coping courses are seen at the top, followed by a twined fillet molding, while under this is a line of very ornate snouted masks. The broad space below is filled with bold fret-work, set on a lattice ground and interrupted by the wonderful over-door trophy, the central feature of which is a human figure, fully life size, sculptured in the round and seated in a niche with festooned base. The head was where the minute white cross now appears, and was surmounted by an elaborate and colossal head-dress, most of which remains. The horizontal bars terminating in serpent heads at both ends are separated by lines of hieroglyphs.



OVER-DOOR ORNAMENTS, EAST FACADE, GOVERNOR'S PALACE.

the ends and sides grotesque faces with their projecting snouts are carried in very effective lines from top to base of the sculptured zone dividing the fretwork into sections. The designing and execution of this work were tasks worthy a great people and a well-matured culture.

The great beauty and boldness and the surprising elaboration of the work in this wonderful façade-mosaic are well indicated in Pl. V. which represents the central over-door design and is reproduced from a portion of one of Charnay's photographs. At the top is the wide, flaring, coping surface, formed of two courses of plain stone work, and below are the other two members of the frieze molding, the middle, square-faced one being sculptured to neatly represent a straight fillet intertwined with a meander. Next below is the row of elaborate masks, rather dimly made out, but showing the curved, broken snouts, the deep eyes, the squarish ear ornaments with pendants, the obscure mouth and the serpent brow-band upon which is set a stellar orament. Below at the left are portions of the lattice ground and of the two rows of great frets with their connecting stems of square stones with square figures cut in the face of each. Small bits of the same are seen at the right, and between is the elaborate, over-door piece which must be regarded as one of the greatest efforts of the Maya sculptor-builder. The doorway below is broken out through decay of the lintel which was about on a level with the base of the picture.

Above the doorway was the usual three-membered molding, a part of which remains, and from the upper edge of this rose the central device consisting of a V, or keystone-shaped arrangement of horizontally placed serpents, eight or nine in number, with square, bar-like bodies and with heads at both extremities, while between the bodies in horizontal rows are indistinctly seen six or seven lines of hieroglyphs. This sculptured trophy is crossed vertically by an elaborate piece of sculpture which embodies, as its chief feature, a human figure—now badly mutilated—and its lofty and elaborate feather headdress. The minute, white cross seen near the middle of the picture takes the place left vacant by the fall of the head of the figure. The ribbed cape and chest ornament and the arm stumps appear below, and the straight, round body with projecting devices about the waist, and the legs—the right broken off above the knee and the left below the knee—may be detected. The figure occupies a semicircular, festooned seat, and the feet probably rested on bracket-like sculptures, portions of which are still seen. The figure has been of life size or a little larger, but was much dwarfed by the colossal head-dress. In the lower left-hand corner of the picture three courses of the plain

lower wall-zone are seen, and on one of the stones are imprints of the mysterious red hand.

As seen from the west this building is a truly wonderful creation, and set high above the plain upon its stable terraces, it must have been a residence worthy of any barbarian ruler or priestly potentate. The most novel and striking features of this building are the two high, pointed archways which, with their deep recesses extending from roof to floor, break the monotony of the façades. The original function or significance of these archways is a matter for careful consideration. We cannot assume for a moment that they were designed for architectural effect, as the lines of the arches are antagonistic and harsh, yet on the other hand one cannot imagine that such colossal vaults would be constructed for mere convenience of passage back and forth through the building.

It appears to me that the only reasonable solution of the problem as to the function of these strange gateways is furnished by the theory that this structure was regarded as only one member—the first to be built—of a great quadrangle, and that the openings, not called for until the group was complete, were for the time being walled up.

Buildings of this oblong, narrow plan were usually grouped in fours about a court, and as all sides of a quadrangle could not be built at once, one would precede the others; and we are at liberty to assume that the end of these grand building operations came when this single structure was completed. The heaping up of the great terrace on the east side may have been the first step in the direction of adding the other buildings.

These arches are among the most remarkable in the country; each is approximately twenty-five feet long, ten feet wide and twenty feet high. The spring of the side walls begins near the floor and extends at a steep angle to the capstones above. Finding these great portals useless features of a single building, a wall was built midway across each, and the spaces were inclosed by adding exterior walls, forming square rooms with exterior doorways, as shown in the plan, Pl. VIII.

As a rule in these quadrangular groups, of which I have studied perhaps a hundred, one of the four structures is more important than the others, and is built upon a terrace or pyramid of superior height overlooking the court and overtopping the other buildings. Such is the case with the Nunnery Quadrangle, the House of the Magician and the House of the Pigeons, and with numerous corresponding groups in southern Mexico.

HOUSE OF THE TURTLES. This building is much inferior to most of the others in dimensions, but is regarded as a very representative and handsome structure. It is seen in the panorama at the right of the Palace and on a projection of the second terrace at the northwest

PL. VI. MIDDLE PORTION OF THE HOUSE OF THE PIGEONS.

In the middle of the picture is seen the remaining portion of the vaulted portal which led through the north building of the quadrangle into the court beyond. The façade has entirely disappeared, and sections of the front range of rooms are seen, displaying the solid masonry of partition walls and roof. Above is the remarkable roof-comb, which extended the entire length of the building along the middle of the roof. Below is the long monotonous line of door-like openings which penetrate the comb wall, having no function other than that of ornament. Above is the rigid line of moldings and over this are shown five of the nine perforated gables, erected for no other purpose than that of holding aloft elaborate sculptured decorations.

MIDDLE PORTION OF THE HOUSE OF THE PIGEONS.

corner. It is peculiar in being unassociated with other buildings. In plan it is a rectangle nearly 100 feet long and some thirty-four feet wide. The east and west ends are in an advanced stage of ruin, and portions of the walls and roof near the middle have fallen. The apartments were of the usual character and construction, but details of the plan were not made out. The exterior is exceptionally simple in its decoration, the main features being a wide band of columnar ornament, filling the upper zone of the wall, and a line of sculptured turtles set rather far apart along the frieze moldings.

HOUSE OF THE PIGEONS. This unique structure, seen in the panorama to the right of the House of the Turtles and somewhat farther away, is the ruin of the north building of another remarkable quadrangle which could appropriately be called the Quadrangle of the Nine Gables. Pl. VI shows the central part of this building, the partitions and back walls of the front tier of chambers appearing at the base behind the white figures.

The ancient builders certainly did not lack originality and boldness. We find ourselves constantly encountering the marvelous, and pausing in amazement before structures that are destined to remain riddles for all time. Here was a great building, of usual construction and size, with an arch opening through the middle into a court—as in the south building of the Nuns' Quadrangle—bearing upon its roof a colossal, masonry comb built at an enormous expenditure of time and labor. The wall of this comb is very thick below and is faced with cut stone. About four feet from the base is a band of molding of usual type which extends the full length of the building. The wall below this is perforated by a row of upwards of fifty door-like openings. Above the moldings the wall is divided into nine sections which rise in steps to some twelve feet in height, terminating in points now somewhat broken down. Only eight of these pinnacles are still standing, though I have taken the liberty of showing the full number in the panorama. Each of the gables is perforated with upwards of thirty rectangular, window-like openings arranged with varied spacing in seven horizontal rows. From the face of these gable-like piles are seen projecting stones which are all that remain of what must have been bold and effective groups of sculpture, and there can be little doubt that this colossal comb of masonry was built exclusively for the purpose of embellishing the building and holding aloft its sculptured ornaments.

The court of this quadrangle is, according to the statement of Stephens, 180 feet from east to west and 150 feet from north to south. The south building is in ruins and is penetrated by an arch similar to that in the north building just described; this is barely visible in the panorama. The east and west buildings are in an advanced state

of ruin and must have been inferior in importance to the other members of the quadrangle.

SOUTH QUADRANGLE. Beyond the Quadrangle of the Seven Gables and in the distance in the panorama is another quadrangle with a much smaller court, having low buildings on the east and west and a fine temple-crowned pyramid on the south side. The latter, according to Stephens, is some 125 feet by 200 feet in dimensions at the base and fifty feet high. The superstructure is a building of the usual style and apparently closely resembles that of the House of the Magician at the opposite end of the city. A broad, well preserved stairway leads from the front of the temple down to the court on the north.

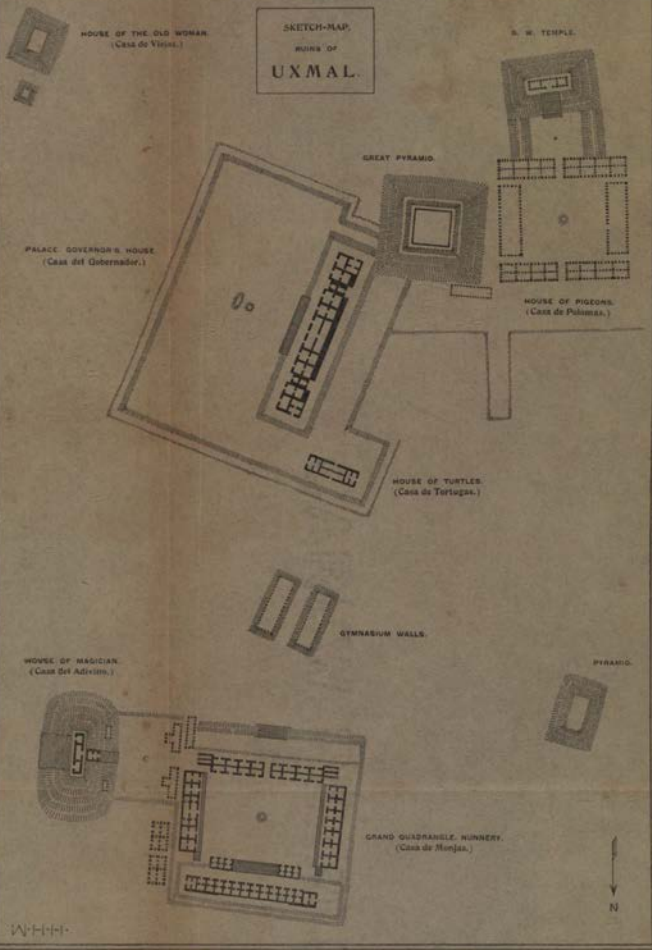
THE GREAT PYRAMID, ETC. One of the grandest structures in Uxmal is the great truncated pyramid seen in the panorama rising at the southwest corner of the main terrace of the Palace. It is sixty or seventy feet in height and measures, according to Stephens, some 200 by 300 feet at the base. This author describes a summit platform seventy-five feet square and three feet high, and a narrow terrace extending all around the pyramid fifteen feet below the crest. The surfaces seem to have been richly decorated with characteristic sculptures. Unfortunately there was no time to visit this section of the ruins, and the two small pyramids seen at the left in the panorama had to be passed by without examination. Some photographs of the latter group in my possession show interesting architectural features, including a pierced roof-comb resembling the work on the House of the Pigeons, though not serrate. Remains of buildings and terraces are seen on all hands. Some quite important structures are located to the west of the Nunnery Quadrangle, one of which is indicated in the panorama; another farther out shows hewn stone walls and usual doorways and arched chambers.

Scattered about the ruins are a number of unique and interesting sculptures. One of these was discovered by Mr. Thompson half a mile south and a little east of the Governor's Palace. It is a tapering column five feet high, twenty inches in diameter at the base and twenty-eight inches at the top, and has near the upper end two series of neatly sculptured glyphs. It is shown in Pl. VII., which is photographed from the cast made by Mr. Thompson for the Columbian Exposition and now in the Field Columbian Museum. Another, illustrated by Stephens, and now placed on the portico balustrade of the Hacienda at Uxmal, resembles a stone seat or chair, such as are seen in the Palenque bas reliefs, and has sculptured grotesque, tiger-like heads at the extremities. It probably served as an ornament or supported some important piece of statuary. A similar specimen is seen in one of Catherwod's drawings, inserted, apparently, in the lower part of an exterior wall-niche.

PL. VII. INSCRIBED STELA OR COLUMN.

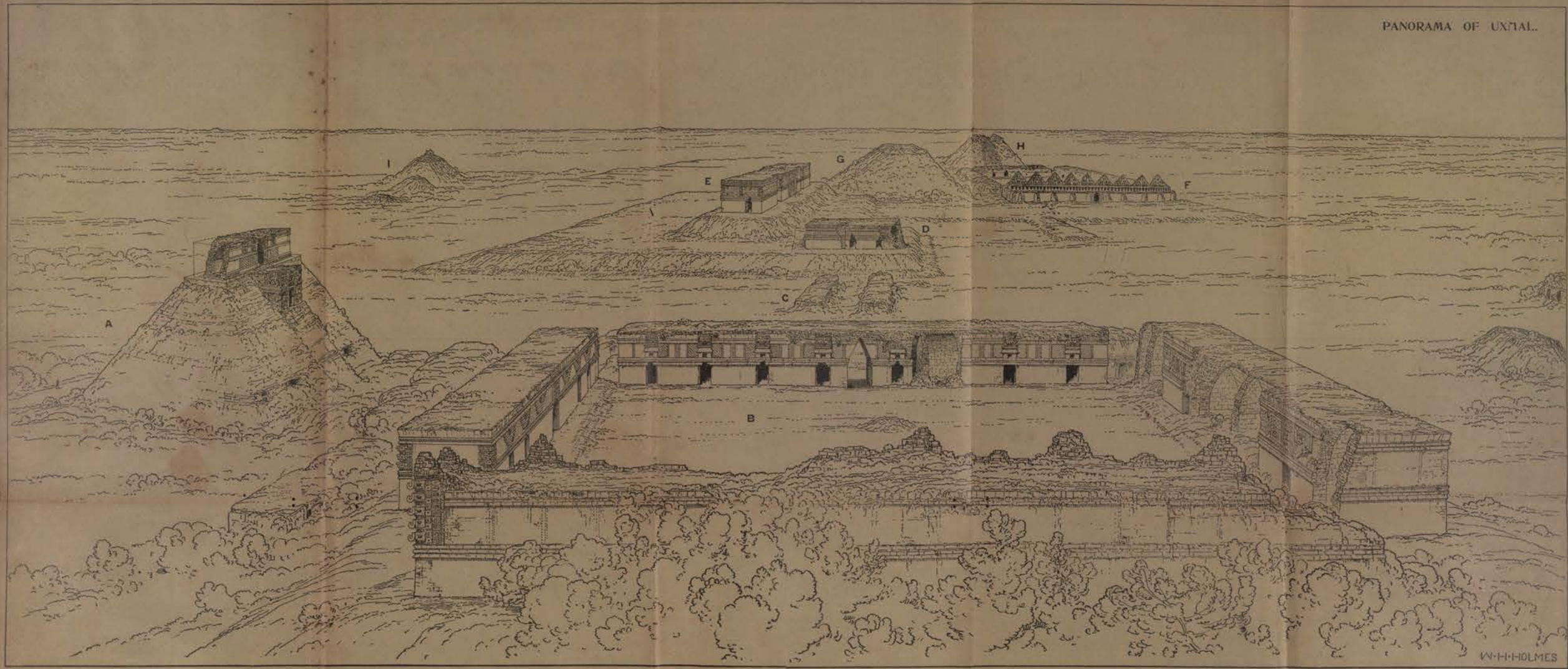
This interesting object was found a little south of the Governor's Palace, Uxmal. Its height is 4 feet 9 inches, diameter at base 21 inches and at top 26 inches. A single line of glyphs encircles the upper margin of the stone and a cartouch-like group of glyphs appears on one side. These inscriptions are very neatly executed and serve to indicate the style of writing practiced by the ancients. Material, gray limestone. Photographed from a plaster cast, prepared from molds made by Mr. E. H. Thompson for the World's Columbian Exposition.

INSCRIBED STELA OR COLUMN.



Point of View of Panorama.

PANORAMA OF UXMAL.



IZAMAL.

Scant justice has been done to Izamal by any of our travelers and explorers, as like ourselves they had splendid Chichen in view and hurried by, casting hasty glances to the right and left. Seeing the huge dismantled monuments of a vanished people obscured and disfigured by the weak and flimsy structures of a modern village, the student is filled with regret and sadness. Half a dozen massive mounds, rising above the general level of the village, can be distinctly seen from the house-tops surrounding the public square, and it is said that traces of many more are still to be found if search is made. Nothing whatever remains save these solid masses. Portions of cut stone facing, traces of stairways, and a few stucco ornaments are still to be seen, the latter exposed to view in recent times by the removal of debris from the slopes of the mounds. The grandest pile was recently remodeled as a fortress, and the second in size is entirely encased behind the walls and beneath the floors of a Spanish cathedral. I sought in vain for material for a panoramic view, but only fragments are in sight, and no time was to spare for negotiating with householders whose back lots and gardens, separated by high walls, divide the heritage of the ancients.

The great pyramid, situated in the northern part of the village, is seen directly ahead of the train as we approach from Merida and is one of the most imposing piles in Yucatan. Its whole height is about sixty feet. The lower terrace is upwards of twenty-five feet high and is perhaps 300 feet square at the top. From the surface of this and set back near the northern margin rises a pyramid some forty feet in height, the summit measuring thirty feet from north to south and some sixty feet from east to west.* The approach was apparently from the south by two stairways, one rising from the ground to the first level, and the other from the terrace to the truncated summit which must originally have been crowned with a temple. Portions of the cement floor still remain, though possibly not entirely aboriginal. The lower stairway is replaced by an inclined way, and recent military operations have so modified the upper flight that the original form is uncertain. Little is left exposed of the surface facing of hewn stone—the material having been convenient for house building—but numerous cut stones of large size are seen about the lower slopes. Excavation would no doubt disclose interesting remnants of the ancient walls.

Midway in the northern slope of the structure is an irregular, partially filled opening extending obliquely downward toward the

*Dimensions here given are estimates and from memory.

center of the mound. It is said to have been dug in the search for interior chambers, and the reports as to the results are very conflicting, Stephens, however, averring that he had satisfactory proofs of their existence. The mass is composed of broken limestone irregularly set in mortar. A distant view of this pile is given by Charnay.

The broad mound occupied by the Cathedral must have been a leading feature of the ancient city, and no doubt supported a temple or other important building. It seems to correspond somewhat closely with the lower terrace of the great mound in height and other dimensions.

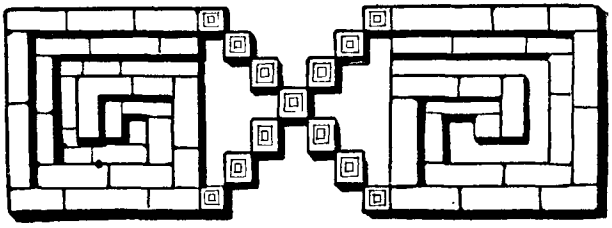
The most interesting monument of the place is situated just west of the public square of the town and occupies the back lots and gardens of perhaps half a dozen dwellings. It is some twenty-five feet high, but is imperfectly defined in horizontal dimensions. The width at the south front is something like forty feet; the main mass extends back to the north sixty or eighty feet and then falls off to a few feet in height, connecting, apparently, through several gardens, with a considerable mass farther on. Portions of the debris that formerly veiled the walls have been removed along the south end and for some fifty or sixty feet along the sides. It is on the east side near the southeast corner that we encounter the mutilated remains of the great stucco face to which several writers have referred. Originally it was a superb work, the face, some five feet wide and seven or eight feet high, having been boldly modeled and neatly finished and painted. The chin is only a few inches above the present level of the ground. This is the head illustrated by Charnay, while the *cara grande*, a boldly modeled head, raised several feet above the ground and surrounded by rough, stone wall surface, illustrated by Stephens, appears to have been on the south face, that part of the pyramid being now obscured by buildings. I present in Fig. 27 a sketch—our photographs having failed in clearness—showing the head in its relation to the decorated space and to the side and rounded southeast corner of the pyramid. The sketch of the elaborate headdress was hastily made, and makes no pretense at accuracy in detail. I am unable to say just how much of the base of the figure is hidden by debris.

The south end of the pyramid, to the left of the corner shown in the sketch, is now completely hidden by modern buildings. The Stephens head, if it is different from that now exposed, may have occupied this wall. The west side has been partially freed of the debris, thus exposing the walls, part of a stairway and a very fine specimen of stucco modeling. The latter is the colossal figure of

FIG. 27. SKETCH SHOWING RELATION OF GIANT STUCCO HEAD TO SIDE AND CORNER OF PYRAMID, IZAMAL.

FIG. 28. SKETCH OF COLOSSAL STUCCO RELIEF, WEST SIDE OF PYRAMID, IZAMAL.

some mythical personage, spoken of by Charnay as "a crouching tiger," but it exhibits no other than human features, as shown in my sketch, Fig. 28. The figure is placed horizontally, in a panel some four feet high by eight feet long, with the face turned south, the whole pose resembling that assumed by a person pitched forward and resting on the knees and elbows. The usual ornamental plumes, and some symbol-like figures fill the interspaces. Above the back of the figure portions of the stucco have been destroyed. The modeling is in bold, well handled relief and has been finished in colors. The panel occupies a nearly vertical wall-space some twelve or fifteen feet above the base of the pyramid.



MOSAIC FRET-WORK, FACADE OF THE GOVERNOR'S PALACE, UXMAL.

Length, eight feet.

CHICHEN-ITZA.

Chichen-Itza—the mouths of the wells of Itzas—is the name given to the most important group of ruins in Yucatan; although it has no single monument to rival the Governor's Palace or the Nunnery Quadrangle at Uxmal, it outranks that city in extent and in the number and variety of its remains. Mr. E. H. Thompson, who has visited, or thoroughly familiarized himself with, all the centers of Maya culture, recognizes the superiority of Chichen as a field for research and has settled down here with the intention of devoting the best years of his life to a monographic study. If he should live to carry out his plan, and he is yet a young man and fully acclimated in Yucatan, we may look forward to a fitting and satisfactory presentation of at least one of the ancient cities of the New World before the processes of nature, aided by the violent hand of man, shall have finally leveled them with the ground. What I present here is the merest sketch such as any archeologist visitor of a few days might glean from surface phenomena, and will not in the least handicap Mr. Thompson in his contemplated work. I hope, however, that it may in a measure aid him through its suggestiveness as to various features and problems and as to the means of presenting them graphically.

Like Uxmal, Chichen is situated in the midst of a forest-covered plain whose monotony is broken only by minor irregularities of the rocky surface. Geologically the country is composed of soft, whitish, horizontally-bedded limestones of late pliocene or early pleistocene age, and the surface appears to have been little modified since its elevation above the sea. Minor changes have taken place mainly through the breaking up of the superficial strata. This has occurred along irregularities of sub-aqueous or shore-line formation mainly through the wedge-like action of forest roots aided by decay and gravitation. These agencies have tended to round the topographic forms, to reduce the height of elevations and fill up the depressions.

Another important class of agencies has been at work producing innumerable small depressions and cavernous openings which now exhibit various stages of development and degeneracy. As described in the introductory pages the limestones have been perforated in various directions by the waters, which in this land of forests are always charged with corroding acids, and underground channels have been formed leading down toward sea-level and outward toward the sea. Enlargements of these channels have in cases taken the form of gaping caverns, and again have led to the falling in of roofs all along the

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drainage course forming sinks, some of which expose the waters beneath. In the Chichen region these features consist of several rounded pits or wells of large size, containing pools of water from which the necessary supply of that precious liquid was obtained in ancient times. Two great wells of this type, called cenotes, occur within the limits of Chichen. Besides these, several conical sinks, possibly dead wells, are also seen; other wells and sinks of varied conformation are found on all hands without the city limits. To the existence of these natural wells we undoubtedly owe the presence of the ancient peoples and the building of cities in this unpromising region, for there is no running water in all this part of Yucatan.

This place was one of the most important centers of Maya culture during the prosperous period preceding the coming of the Spanish, and, though it was occupied by its builders for nearly 200 years after the discovery, little is known definitely of its history. I shall not stop to review either the historic or archeological literature of the city, as others have done so at considerable length, and we may reasonably expect that an exhaustive monograph will soon be forthcoming from the pen of Mr. Thompson.

Fifty years ago the site of Chichen was a prosperous hacienda with the considerable village of Pisté near by, but the southern tribes rose and massacred or drove out all the inhabitants. Since then the wilderness has again claimed the region, and but for recent clearings by explorers, and a few native cornfields in the vicinity, slight trace of the once prosperous city would now be visible even to the bird that hovers over the forest.

The principal ruins of this group are included within a space considerably less than a mile square, and consist of half a dozen important piles with numerous remains of inferior structures scattered about, some of the latter being so completely buried in the forest that their exploration has never been undertaken. A glance at the various monuments and their assemblage upon the site quickly dispels any notion that may have been formed of the existence here of anything like a modern city. The great buildings are not so scattered, perhaps, or so diverse in their orientation as the principal structures of such cities as Rome and Paris, but the points of the compass were but lightly considered, and there are no indications of lining up in any direction to suggest streets, squares or systematic grouping. Historians speak of roadways radiating through the forest and connecting with other centers, but the traces are so meager as to have commanded little attention.

In plan and dimensions the buildings are greatly diversified. The pyramid-temple, of which there are over a dozen examples in

various stages of ruin, may be regarded as the prevailing type of structure. The ground plans generally show very simple arrangements of corridors, vestibules and chambers, the number of apartments being small and in no case exceeding twenty; the most unique features are found in the Caracol or Round Tower. There is no building in which one story is superposed upon another—save perhaps in the Caracol where the evidence is somewhat indefinite—and underground structures are unknown. Several buildings are founded on the original surface of the ground or upon sites but slightly leveled up, while others occupy artificial terraces and pyramids of greatly diversified height, outline and manner of treatment. Walls of buildings are usually nearly vertical, exceptionally a little flaring, and in one or two cases the upper wall-zone slopes inward, becoming, in a sense, part of the roof. The lower zone is usually plain, and the upper, where vertical, is with rare exceptions decorated with panels of composite sculpture.

The roof is level and surfaced with cement, and the floors also are usually of cement. The arches employed in ceiling all apartments are wedge-shaped and include two varieties. In one style the inward sloping walls are closed above with a row of horizontally-placed slabs, and the other by two lines of slabs leaning together at the top. Doorways and openings of all sorts are spanned by horizontal lintels of wood or stone. Doorways are of moderate or large size and bear no evidence of the association of doors of solid material.

The materials employed by the Chichen builders are the soft, light-gray limestones of the locality—largely quarried, no doubt, in the immediate vicinity—and ordinary lime-sand mortar, besides wood and other vegetal materials, preserved in a few instances only. The hearting of the pyramids and thicker walls is composed of broken stones and mortar irregularly thrown together yet forming generally very compact and stable bodies.

Ordinary surface masonry, especially in the less pretentious buildings, is of irregular, imperfectly hewn stones, laid up with little apparent skill, transverse bonding and the proper breaking of joints being sadly neglected. All important wall spaces in the principal buildings are faced with accurately hewn blocks, neatly laid but with little mortar save at the back. Lintels, jamb stones, corner-pieces, cornices, coping, columns, pillars, balustrades, sculptured interiors and the like are of large stones well dressed and skillfully laid. The greatest skill of the mason was not shown until he essayed to place the composite sculptured decorations of the great façades, a complicated and difficult operation. Here, as elsewhere, the wooden lintel was the weak feature of the construction, and its use led to the premature destruction of many an important façade.

The Chichen sculptor seems to have worked in the round and in various degrees of relief with equal facility, and composite sculpture, in which many separately carved pieces were set together in colossal designs, was practiced with remarkable success. The work is everywhere characterized by rude vigor rather than by refinement of conception or delicacy of execution. Sculpture was employed for little else than architectural embellishment, and it is not quite certain that any of the human or animal figures found about the ruins were statuary in the sense that they were to be independently installed and separately viewed or adored. I saw nothing that by its character or placement could be safely classed as an idol pure and simple. The tigers are probably seats, the serpents form columns or balustrades, the standing human figures are mainly of caryatid-atlantean type and served as supports for tables or altars; and even the recumbent, Chac-Mools of Le Plongon, must have been intended for altars or for supporting some feature of the temples in which they are found.

The study of even a single example of the great façades is sufficient to impress upon one the vast importance of the sculptor's work, but the immense range of his field is appreciated when the heavy rattle-snake columns, the colossal serpent balustrades, the long lines of caryatid-atlantean figures, and the graphic relief sculptures of temple interiors and pillars have been passed in review. The life subjects had perhaps in all cases a mythologic origin and application, being employed in buildings or situations consistent with their symbolism. Purely geometric motives are numerous, important and highly varied and specialized, indicating on the part of this people, a ripe experience in various branches of art in which the æsthetic had equal consideration with the symbolic.

The tools used in the execution of these works were probably wholly of stone, and sledges and chisels of that material are occasionally found, but the surface of the ground is so completely obscured by vegetation and so buried in the debris of buildings that little opportunity is offered of securing specimens.

Modeling in stucco seems to have met with but little favor in Chichen, but the use of plaster was universal; every imperfect surface was leveled up by this means, and all surfaces, whatsoever their material, degree of finish or elaboration of design, were treated with color. The colors employed were varied and brilliant, and retain their brightness to-day where reasonably protected from the weather. Interior wall surfaces were in many instances finished in various formal and geometric designs, as well as with glyphs, symbolic figures and elaborate graphic subjects.

The function of the various structures was doubtless in the main

religious, the typical temple prevailing over all other forms of building. The names given the various structures are rarely especially appropriate, and serve no other purpose than that of convenience of designation. A few are descriptive, and hence good, and I have taken the liberty of suggesting a few additional names of this class that may be useful.

The builders of Chichen were of Maya stock, but, dwelling in the midst of a unique environment and much isolated from the other branches of the family, there had grown up wide distinctions between their art and that of other sections. The period of occupation, though apparently unbroken, was undoubtedly a long one, covering probably five centuries or more, and extending down to and beyond the coming of the Spanish conquerors.

PANORAMIC VIEW. Though most of the larger ruins are now more or less distinctly visible from the lofty crest of El Castillo, the Caracol or the Palace, there is no point from which all can be comprehended in a single view, so that my panorama had to be constructed from an assumed point of view. The point chosen is a little to the south of the Palace, as indicated on the accompanying map, and at a height of about 150 feet. The drawing from this assumed point was easy on account of the excellent view obtained from the top of the Palace; and with this view as a basis a careful study of the individual structures with respect to their obscured southern faces, has made it easy to present a consistent and comprehensive panorama, though lack of time has rendered it impossible to execute it in much detail. In the foreground is the group of the Nunnery or Palace, A, with its annexed buildings, B and C, seen from the rear. To the right of this is the low box-like form of the Akab-tzib, D, with a deep sink descending from its east front. An oblong pyramid, robbed of its superstructure by modern house builders, is seen in the foreground, and a small mound appears at the left; and beyond and over the east end of the Palace is the Caracol or round tower, E. To the left of this come first the squarish mass of Chichanchob or Red House, F, and beyond over the top of the Palace is the ruined pyramid-temple, G. Near the center of the picture is a small pyramid, from which the temple has almost completely disappeared, and beyond this is the Ball-court or Gymnasium, H. El Castillo or the castle, so-called, with its lofty, stepped pyramid, I, is a little to the right; still farther on is a small pyramid, and to the right are two considerable temple-pyramids connected with an extensive system of ruins, J, of which little is yet known. Two cenotes are indicated, the Cenote Grande at K, in the middle of the picture, and the Sacred Cenote at L, about a mile from the point of view. Pisté would

appear at P. The forest has been largely omitted, and where debris obscures known forms it also has been ignored.

The general view of the plain obtained from the higher buildings is one not easily forgotten. The forest, forming a carpet of rich autumn colors, is unbroken save by the ruins near at hand whose summits rise above the tree-tops, and a pyramidal mass on the horizon far to the southwest.

THE NUNNERY OR PALACE. The so-called Nunnery or Palace, A, seen in the immediate foreground of the panorama, is one of the most interesting and important buildings in Chichen. It has associated with it at the right two smaller buildings or annexes, B and C. The group appears to rest almost directly upon the original surface of the site which was, however, somewhat uneven, necessitating a good deal of leveling up, as on the south side or back where there is considerable descent from the base of the walls. A little in the rear, and to the southeast, just outside of the view, is a deep conical sink, possibly representing an extinct cenote.

It is unfortunate that the point of view chosen should bring the rear of this fine group into the foreground, throwing the north façades and the great stairway out of sight, but there is compensation in the fact that a glimpse is obtained of the east façade of the main building and the south end of the Iglesia, B. We are able, by the aid of the panoramic view, to comprehend at a glance the relation of the three associated structures to one another and to the rest of the monuments.

The east façade, which is one of the most remarkable pieces of architectural work in Yucatan, is illustrated by Stephens, and a portion of it is shown by Charnay. I give a more comprehensive view in Pl. X, which includes the Iglesia as well.

The main building, A, is composite in character, and represents apparently two or three successive stages or epochs of growth, and there are, besides, some indications of diversity of construction and style. A hasty study shows that there are three or four somewhat independent sections of the building; first the L-shaped wing on the ground level at the east end; second, the main rectangular mass with the large one-story building which it supports; and third, the small edifice crowning the pile. A closer analysis, however, gives a different result in part, and we are able to make out the relation of various features with respect to their order of construction. The original ground story structure was about 100 feet long, somewhat less in width, and as high as the present main terrace. It had vertical walls with moldings at the top, and a narrow ledge around the base some ten feet above the ground, corresponding almost

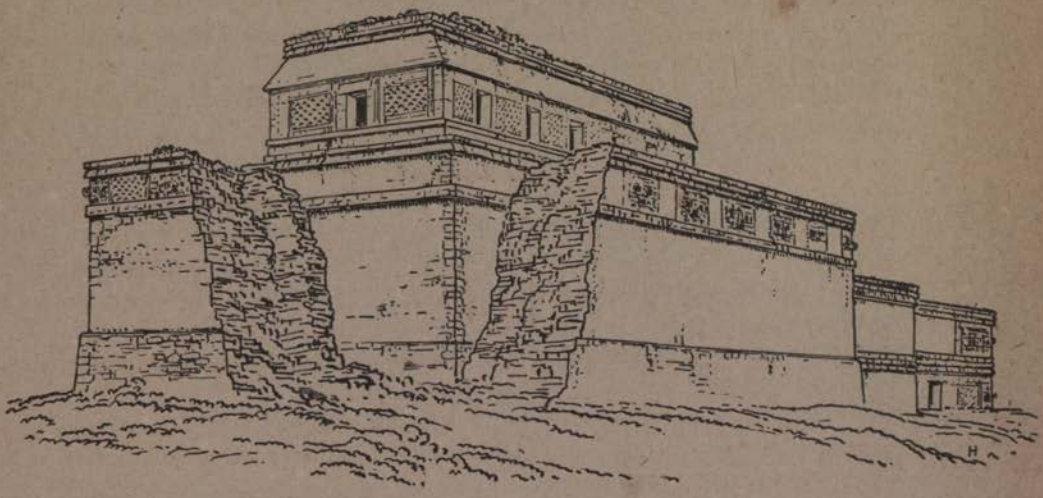


FIG. 29. SKETCH OF SOUTH-WEST CORNER OF NUNNERY OR PALACE.

Showing breach in encasing masonry and character of inner wall.

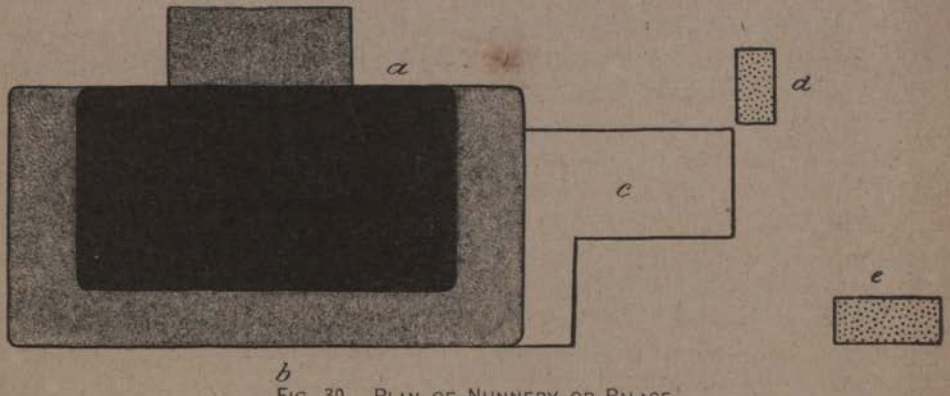


FIG. 30. PLAN OF NUNNERY OR PALACE.

Indicating probable stages of growth. The black represents the nucleus, the gray the first addition, the white the second addition. *d* and *e* are annexes.

exactly with the present outer profile. It was apparently a solid body of masonry built to support the present superstructure, with a large esplanade on the north at the head of the stairway, and narrow ledges on the east, south and west.

It is clear, that the original structure was completed all around before the great mass of encasing masonry, some twenty feet thick, was added on the three sides, forming the present wide terrace. Evidence of this is seen in the present north wall where the splicings were made, and at the southwest corner where the outer shell has fallen away, exposing the inner wall to its full height, as shown in Fig. 29. The relation of the older wall and profile to the outer wall and newer profile is clearly shown in the section, Fig. 31. It would seem from these facts that either the addition of encasing masonry was not originally contemplated, or that unusual methods of carrying out a construction were in vogue. These conditions are nearly identical with those observed at El Meco on the eastern shore, and are duplicated at Palenque, Uxmal, and elsewhere.

Observing the very narrow ledge or esplanade that would be left on the ends and south side should the encasing masonry be removed, I am led to inquire how the doorways of these portions of the building could have been entered before the terrace was added. I note first that it is somewhat unusual to find buildings of this class entered from the back opposite the stairway, and observe further that the niche-like, false doorways, seen in the inner wall of the south chamber, Pl. XI, have no significance as they stand to-day. I am thus led to surmise that the south wall may have been originally imperforate, and that access to the south rooms may have been obtained from the north side, by doorways now represented by the niches. The filling up of the north chambers and the building of a third story chamber must have made it necessary to undertake extensive changes in the way of terracing, cutting doorways and ornamenting façades.*

It seems highly probable, considering all visible phenomena, that the fine second story structure belongs to the original period of building, and it is surmised that the small crowning structure is of late date, possibly representing the latest stage of growth. The east, or ground-floor wing was not added until the encasing of the central mass was complete, as we observe that, at the point of junction in the south wall, the newer masonry is built to fit the rounded corner of the greater mass. Though these steps are apparent—and others probably remain to be observed—it seems that there is not sufficient difference in architectural style, in manner of construction, or in

* I should have mentioned the occurrence of a ledge of masonry showing in the surface of the platform a few feet from the south and east walls of the building, that may represent an early margin of the esplanade. This ledge is indicated in the panorama, and at *a* in Fig. 31.

decoration to indicate widely separated periods of building or occupancy, but the visible stages of construction are significant of prolonged occupancy of the site. That the period witnessed many changes would seem to be distinctly indicated by differences in arch construction, by variations in the profiles of the buildings and by diversity in the forms taken by certain decorative motives.

I cannot undertake to present anything like a full description of the buildings, but shall review briefly some of their principal features. The general plan is indicated on a small scale on the accompanying map. A transverse section of the main structure is presented in Fig. 31. Though the central portions are not fully made out the manner of adding the encasing masonry of the pyramid is indicated at the left, and the stairway, having similar relations to the mass, appears at the right.

Thirty-nine steps lead from the ground to the main level or esplanade above—a height of thirty-two feet. The superposed building sets back some thirty feet from the head of the stairs, and has a space upwards of twenty feet wide at the ends and on the south side. It is about ninety feet long, thirty-two feet wide and eighteen feet in height. It appears to be bi-symmetric in plan, having five doorways on each side and one on each end. The end rooms extend entirely across the building. The lateral tiers comprise three apartments each. The middle rooms are long and are supplied with three doorways each. The northern tier has been filled up with masonry presumably to form a satisfactory foundation for the superposed apartment. The end rooms are entered by single doorways. The lateral rooms on the west are nine feet wide and have a number of wall niches, resembling false doorways, at the back, imperfectly shown at the right in Pl. XI., which is a view looking west in the long hall.

The door jambs, the lintels, and the rounded corners of the building are formed of stones of large size. The most striking peculiarity of construction is the retreating profile of the upper wall, as seen in the section, a character occurring rather rarely in Yucatec buildings but almost universal in the Usumacinta province. This may have some significance as being associated with what may well be considered the most ancient building now standing in Chichen. This building is also unique in its decorative treatment. The lower wall is elaborately embellished with geometric sculptures arranged in large panels, one to each section of the wall space, as seen in the panorama. The large panels in the ends of the building are filled with heavy lattice work with dentate paneled interspaces and the sixteen side panels contain boldly sculptured, geometric patterns not seen elsewhere in this group of remains, but corresponding somewhat

in general effect, and at the sides in some details, with the snouted-mask panels in other parts of the building.

The crowning edifice is reached by a flight of twenty steps, interrupted medially near the top by a small structure, resembling a flat-topped dormer window, with a door-like opening in the front. This may have served as a shrine, but possibly had no other function than that of widening the floor space in front of the building above, or of mere embellishment. The structure above is some thirty feet long, twelve feet wide and ten or eleven feet high. It is said to have had but a single room, and is now in an advanced state of demolition. As seen from the back in the panorama it is little more than a heap of stones, save that portions of the north wall and the front doorway with its lintel are intact. Its façade is remarkable for the peculiar use of sculptured stones, stray pieces having been picked up and used without reference to the partial designs carved on them. This surface was probably plastered, or intended to be plastered, if constructed by the aboriginal builders.

The single story L-shaped eastern wing is, so far as the exterior is concerned, a superb specimen of Maya building. It seems to stand nearly on the normal ground level and is sixty feet long on the north and thirty-five feet across the east end, or top of the L, which is generally regarded as the front. The south wing or foot of the L is forty feet long and about twelve feet deep, the back abutting against the pyramid. The height is about twenty-three feet. The apartments of the main section of the building are entered by three doorways on the north, one on the east front and two on the south. The south wing has two doors, as seen in the panorama. The lower wall zone contains the doorways and has, on the north and south sides, alternating with the doors, the usual mask and lattice decorations in panels, together with some plain spaces, and the façade on the east is filled with two tiers of the great snouted masks at the right and left of the fine doorway. The upper wall-zone presents one of the most richly decorated spaces of its kind in America. The north side contains six mask panels, with three rosette panels unsymmetrically placed; the east façade has a central panel over the door, in which is the sitting figure, described farther on, and grotesque mask panels at the right and left with corner-pieces of the same. The south side has one mask panel at the outer end, the rest of the space being plain as seen in the panorama. The moldings separating the wall zones and forming the cornice above are more than usually elaborate, embodying many tasteful minor moldings, glyphs, symbols and devices. Even the flaring coping stones on the south front are embellished with three examples of what could well be taken for Tlaloc symbols, as they embody a

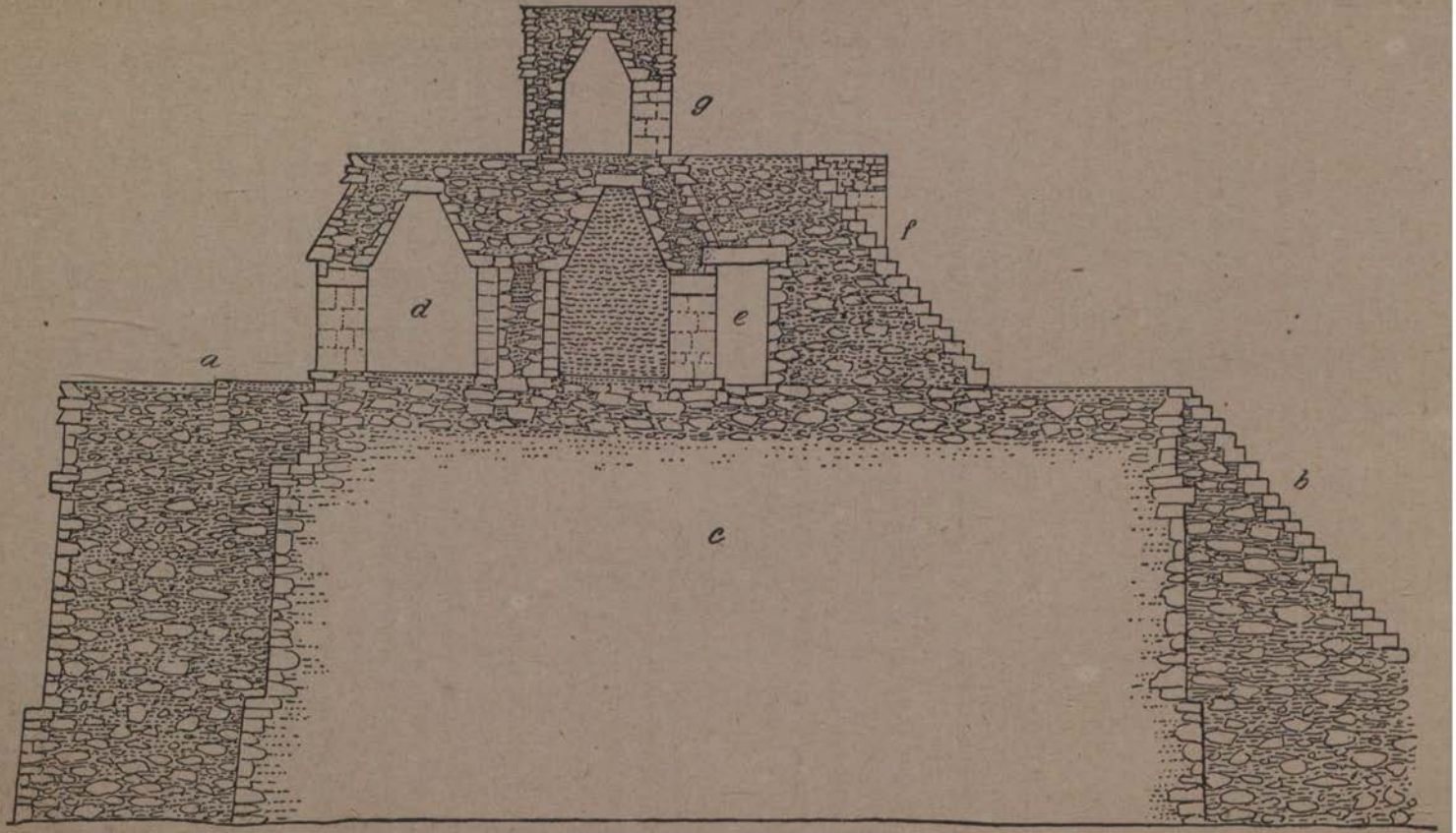


FIG. 31. SECTION OF NUNNERY OR PALACE, CHICHEN-ITZA.

Showing earliest portion, *c*, with superstructures, and additions at the right and left.

projecting snout and five or six pendant lines or grooves, suggesting the rain god of Mexico.

The panorama gives a very limited idea of the northern annex or Iglesia, as only one end is seen. It is fourteen feet wide and twenty-six feet long, and the building proper corresponds closely in height to the neighboring structures, but the façade on the west face is carried up some eight or ten feet higher, repeating the conventional ornaments of the zone below, though omitting some of its peculiar features. This flying wall is quite thick, is perforated along some of the lines of ornaments, and is backed with masonry lattice work. The lower wall-zone is of plain masonry, formerly plastered and painted, but the upper walls are entirely covered with boldly sculptured figure groups, masks and moldings, and fairly bristle with the hook-like mask-snouts. The walls incline outward slightly, giving the building a top-heavy look. A single and very plain doorway gives entrance to the chamber which is arched as usual and without notable features.

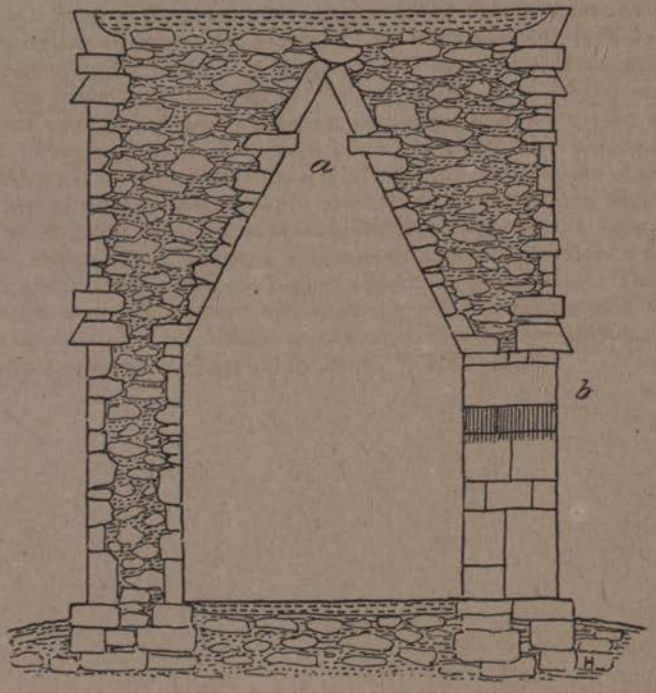
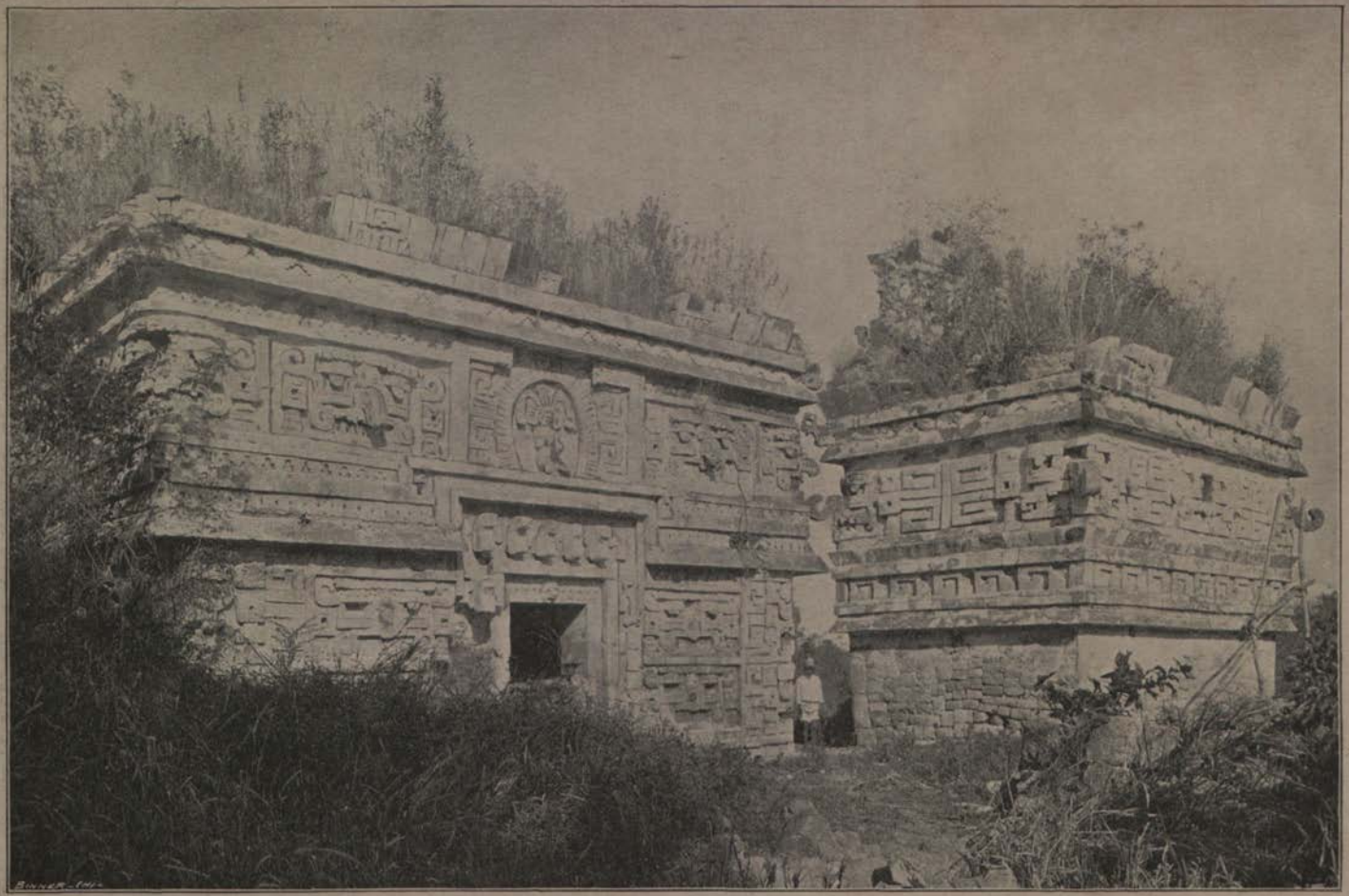


FIG. 32. SECTION OF LARGER ANNEX, PALACE, CHICHEN-ITZA.
a. Arch with lean-to apex.
b. Doorway with stone lintel: North side.

In the panorama the outer annex, at the right, C, is seen from the rear. The end and back walls are quite plain, save for the two rigid

PL. X. EAST FACADE AND IGLESIA, NUNNERY OR PALACE.

The east front of the ground-floor section of the Palace is seen at the left. It is characterized by unusually bold and effective ornament, both lower and upper wall-zones being covered with sculptures. Two lines of snouted masks appear in the lower zone and one line in the upper. The medial and frieze moldings are embellished with geometric ornaments and the coping course is sculptured. The doorway is an elegant piece of work and is unique in many respects. Above is a center piece of much interest, the main feature of which is a human figure, probably representing a chief deity, in high relief, seated in an arched niche, with the usual, conventional, feather designs at the right and left. At the right is the Iglesia annex, a single-room structure, similar to the main building in general treatment, but having a plain lower wall-zone. The façade, which is on the west side and not visible in the plate, is surmounted by a high, richly decorated false front. Mask snouts, most of which are broken, are seen in profile at the corners. Photograph by Dr. C. F. Millspaugh.



EAST FACADE AND IGLESIA, NUNNERY OR PALACE.

bands of moldings. The front is finished and ornamented in a style resembling the adjoining buildings, the lower wall being plain and the upper decorated with masks alternating with lattice panels. It is a block-like pile, thirty-eight feet long, fourteen feet wide and twenty feet high, and contains two rooms spanned above by the wedge-shaped arch, corbellate as usual below, but finished at the apex with two rows of leaning stones instead of horizontal slabs, as seen in Fig. 32. The entrance proper was by a north doorway of usual style to the present east room, and from this a doorway led into a west room. A second doorway opened through the east wall into an apartment now entirely removed; the contact lines seen on the wall indicating that it was of inferior size.

In its decorative features this group of structures is of exceptional interest and may be spoken of at some length. The façade of the east wing of the main building, and the west face or front of the smaller annex or Iglesia, are marvels of elaboration, boldness of sculpture, and originality of design. In the former case the decorations cover the front from base to coping, and this is true of parts of the north and south walls, but in the latter case and in all the other ground-floor walls, the lower zone is plain. A reversal of this order is seen in the main second-story building, where the lower zone is decorated, and the upper zone, which is sloping, is plain. In this upper building we have only geometric motives; in the other cases the leading motive is the grotesque snouted mask. The lattice motive worked out in many styles occurs throughout the group. In some places this motive alternates with the mask, and again the mask occupies the entire space.

In the walls of the central sub-structure the only decoration is a frieze band, some five feet wide (see panorama), in which the mask panels alternate with lattice panels, boldly sculptured masks occupying the corner spaces. In the north wall of the east wing of the main building, effective rosette designs, possibly developed from the lattice motive, alternate with masks. The probable significance of this association of decorative elements in Maya structures will be dwelt upon in a subsequent section.

Three special groups of sculpture are observed. The most striking is that of a human figure of about life size occupying a recessed panel over the door in the main façade of the east wing. The much mutilated figure is sculptured mainly in the round and is seated on the sill of the niche. It is supplied with an elaborate head-dress and surrounded by an arched framework of radiating dentals, possibly representing feathers or light-rays. Outside of this, but still within the panel, are scroll-plumes of the type seen at the right and left in all

the mask panels, thus suggesting the identity of the idea involved in masks and in figure. The panel is bordered or framed in at the right and left and above by two serpents whose bodies are covered with zig-zag, water-symbol lines, the heads facing each other at the top. The doorway below is a remarkable example of Maya portal treatment, in which the snout-hook motive is effectively employed in decorating spaces at the sides and over the lintel. The stone lintel exhibits two lines of glyphs, interrupted in the middle by a grotesque ornament. The remainder of the façade spaces are occupied by the great snouted masks and by the varied and elaborate moldings. These features are shown in Pl. X.

The other special features referred to are found in the main or western façade of the smaller annex or Iglesia, not visible either in the panorama or in the plate. The middle portion of the main decorated wall-zone is occupied by an especially striking and elaborate snouted mask nine feet long by five feet high, against the brow of which was set a human figure of approximately life size, now nearly destroyed. Next this mask at the sides are two deep niches, each occupied by sculptured figures in full relief. In the space at the left is the figure of a man facing another figure not sufficiently complete to be readily made out; in the right-hand niche are two human figures, one facing to the left and the other to the front. They are seated on horizontal ledges of stone, beneath which are obliquely placed stones suggesting the legs of a bench. No doubt these groups, as well as the various other zoömorphic subjects in all parts of the group of buildings, were symbolic and significant in their particular associations.

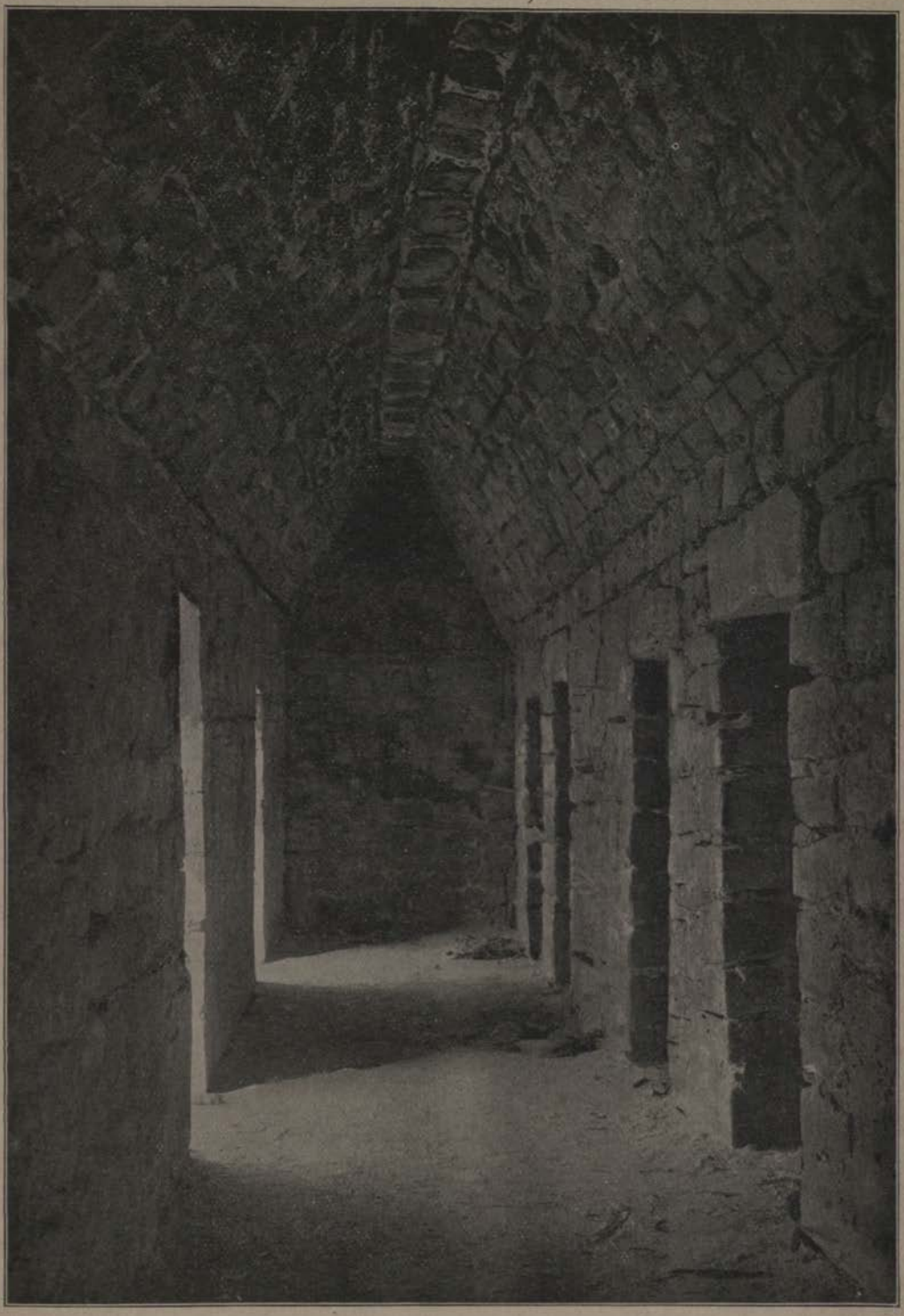
Beside these principal subjects, occupying the great spaces, there are several varieties of subordinate ornament filling molding surfaces, narrow zones and minor spaces. They include beadings, dentals, zig-zags, guilloches, scrolls, frets, etc., and greatly enhance the richness of the effects. The walls, exterior and interior, have been carefully plastered, smoothed and painted; and in various places designs in color have been added, traces of which are yet seen within the rooms of the second story structure.

AKAB-TZIB. A few hundred feet beyond the Iglesia annex of the Palace, at the right in the panorama, is a low rectangular building known by the name of Akab-tzib. It has a very limited architectural interest, and may be passed by without lengthy comment. It is built on the original surface of the ground and on the west margin of a great, conical sink which is irregular in outline and measures in greatest diameter some three hundred or four hundred feet, and has a depth of thirty or forty feet. The length of the building,

PL. XI. A CHARACTERISTIC MAYA VAULTED CHAMBER.

View looking west in the long chamber, south front of the main upper building of the Nunnery or Palace, Chichen-Itza. The masonry is fairly well laid, but the stones are irregular in shape and imperfectly faced. The original coatings of plaster are largely removed, but remnants retain traces of elaborate paintings. The doorways are at the left, while at the right are seen four recesses 20 inches deep and resembling doorways in their construction.

The length of the room is 47 feet, the width 7 feet, and the full height to capstones of the vault some 14 feet.



A CHARACTERISTIC MAYA VAULTED CHAMBER.

according to my rather unsatisfactory measurements, is about one hundred and sixty-five feet, its width forty-eight feet and its height eighteen feet. The walls are thick, well built and faced inside and out with neatly hewn stone, but there is a total absence of sculptured decoration, the façades being broken only by the usual medial and upper lines of rigid moldings, and by offsets in the north and south walls.

The west façade is broken into three nearly equal sections by two shallow vertical recesses three feet six inches wide. The middle part, fifty-six feet long, is set a little back and contains three doorways. The wall here is much broken down, and it is said by Stephens that the space was formerly occupied by a stairway, though no traces of it are now to be found. The east wall, facing the sink, is interrupted by an abutting body of masonry which seems to have been built to strengthen the center of the structure on that side, possibly with the idea in view of adding a second story building. This theory is confirmed by the fact that the eastern apartments behind this projection are filled in solid. The stairway would naturally occupy the opposite space on the west side, but it seems to be doubtful if this feature had yet been added when building operations ceased. The north and south sections of the building are each some fifty-two feet long and have two doors on the east side, two on the west, while one door enters from the south end, and one from the north.

Having lost my plan of the building I am unable to describe the apartments in detail. There are said to be eighteen rooms—a greater number than in any other building in Chichen. All are spanned by the usual arch. The roof is flat and perfectly preserved and supports a dense growth of forest trees.

The only feature of especial interest connected with this building is an inscribed lintel found between two apartments at the south end, and illustrated by both Stephens and Charnay. The seated figure of a man in low relief, with inscriptions at the right and left, occupies the under side of the lintel and a double line of glyphs covers the face. The light is dim at this point, and the inscription came to be called Akab-tzib, or writing in the dark, by the Maya residents, thus furnishing a name for the building. My sketches do not make it clear whether the doorway in the south end of this building, by which the inscription doorway is reached, is in the middle of the wall, as in the panorama, or toward one side.

THE ROUND TOWER OR CARACOL. About two hundred feet to the west of Akab-tzib are the remains of two structures of inferior dimensions. The eastern one, almost leveled with the ground, exhibits cut stone and remnants of round columns. The other is a small

pyramidal mound some twenty feet in height. To the left of this, and just over the Iglesia in the panorama, is the most unique and extraordinary structure in Yucatan. It is the Caracol or winding stair, so called because of a spiral passageway extending upward through the columnar, central mass of the building. Such accounts of this building as have come to my notice are meager and full of inaccuracies, and my description may, therefore, be as full as my observations will permit. At best much will yet remain to be brought out. In orientation this structure agrees pretty closely with the points of the compass, and the exterior doorways accord in placement with the sides of the terraces. As clearly indicated in the panorama, the ruin comprises three principal features, a wide foundation terrace, a smaller upper terrace and a turret-like superstructure.

The lower terrace measures about 220 feet from north to south, 150 from east to west, and is twenty feet high. The faces are vertical in a general way, and consist of a plain zone below, twelve feet wide, and a heavy two-member cornice at the top six feet wide. The masonry facing is irregular and open, but was probably fully plastered during the period of occupation. The stairway is on the west side, and is some forty-five feet wide, and bordered originally by balustrades, formed, as in other cases in Chichen, of colossal serpents, the heads resting on the ground. The second terrace is some sixty by eighty feet in horizontal extent and is twelve feet high. The stairway seems to correspond in character and position with the lower flight, though I was not able to give it deserved attention.

The ruined turret occupies a central position on the upper level, and is about thirty-nine feet in diameter and nearly the same in height. Its state of demolition is such that the exterior conformation cannot be fully made out, and the section given in Fig. 33 leaves portions of the upper profile in doubt, as indicated by the dotted lines. The ground plan is presented in Fig. 34. It is seen that there are two concentric circular walls, inclosing two annular galleries and a central core. The walls approximate two and one-half feet in thickness, the outer being pierced by four doorways placed to coincide with the points of the compass, and the inner by four doorways alternating in position with the outer ones, though not quite equally spaced.

The central core is about seven feet in diameter at the base and eight feet at the spring of the arch, some eight or ten feet from the floor. The outer inclosure or annular chamber is five feet wide and about 100 feet in circumference as measured along the outer margin. The height of the walls to the offset at the spring of the arch is about ten feet. The arch is narrow and acutely pointed.

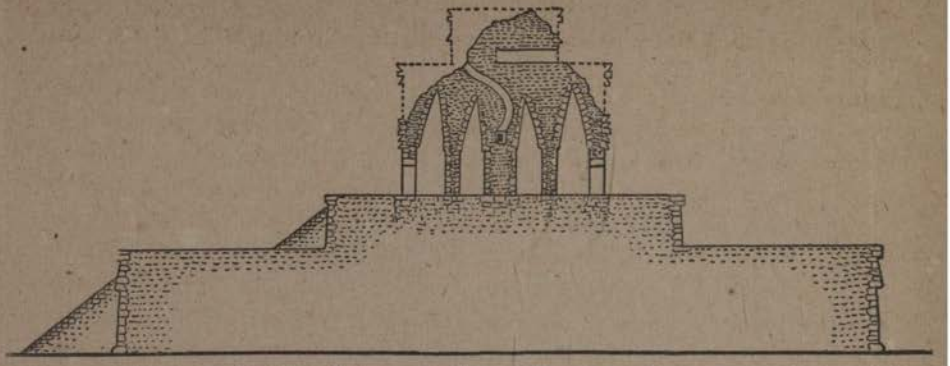


FIG. 33 SECTION OF ROUND TOWER OR CARACOL.
With its terraces and hypothetic profile of upper portion of turrets.

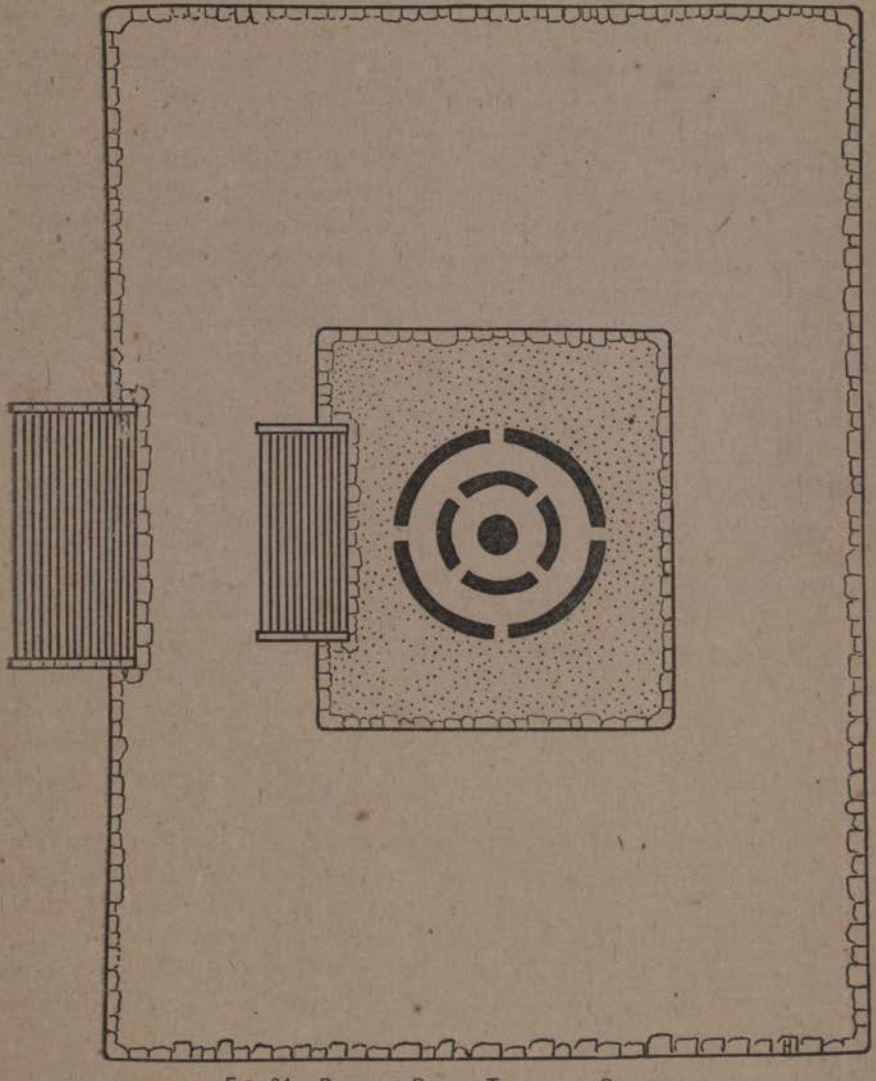


FIG. 34. PLAN OF ROUND TOWER OR CARACOL.
With its terraces and stairways Dotted surface indicates upper platform.

above, the full height from the floor being about twenty-four feet. The inner space is also nearly five feet wide, and corresponds in general character with the outer gallery, but the arch is not so high by three or four feet. As seen in the section, the arches are not symmetric in profile, the outer soffit slope being slightly greater than the inner in both cases. The central column expands above to form the soffit of the vault, and is twelve or thirteen feet in diameter at the apex of the arch.

The conformation and constructive peculiarities of the building are clearly shown in the graphic section presented in Pl. XII. Novel features of the construction of the inner arch are the bracing of the walls with numerous wooden beams and with connecting walls of masonry. There are three of the latter, two of which appear in the plate, that at the left being somewhat out of drawing, as it should connect with the enclosing wall farther to the front. They are supported on heavy stone beams spanning the vault at the spring of the arch, and reach upward to the apex.

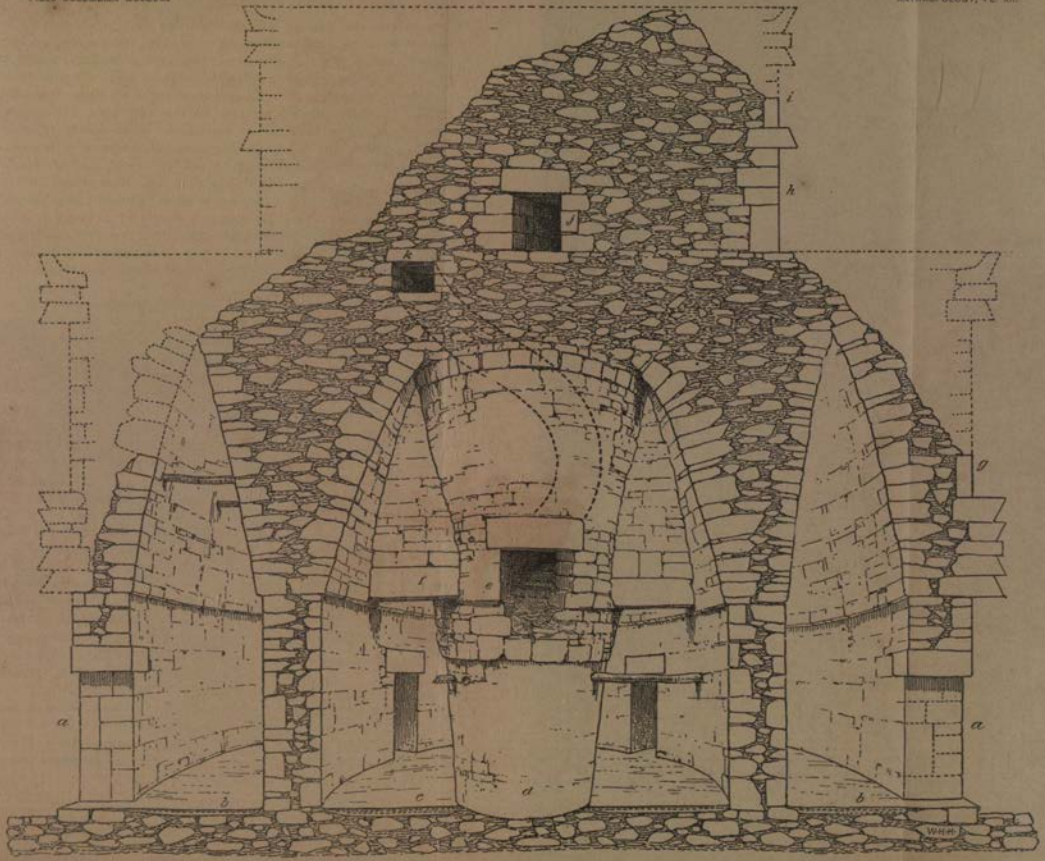
The outer wall of each vault is a kind of lean-to, as the inner section of the building was probably completed in a sense before the next outer portion was added. The inner slope rises at a steep angle, the outer coming forward to meet it at a lower angle. The stones are arranged toward the top to approximate the effect of the keystone arch. I have drawn the central columnar core complete that its character and relations might be more clearly brought out, though the section is as a result somewhat warped.

The entrance to that remarkable feature of the tower, the so-called winding stairway, is shown in this drawing. The opening is about twenty-two inches wide and from twenty-five to thirty-five inches high. It is capped with a heavy lintel-stone dressed with the curve of the wall; the sides or jambs are rather rudely built, and the base, though quite irregular, is carefully plastered over, showing that no well-hewn sill was ever used. This opening is some ten feet from the floor. By piling up debris below I was able to crawl into the dark passage. There are irregular steps, rudely laid, the walls are reasonably smooth, and the ceiling rises in steps corresponding somewhat with the stairs. The passage turns to the right, ascending at an angle of perhaps forty-five or fifty degrees, is dark and barely large enough to permit the passage of a single person of medium size. Having crawled upward some fifteen feet, making meantime nearly one circuit of the building, my head came out among the bushes on the steep broken slope facing the northeast and a little inside of and above the apex of the outer arch. Cutting away the brush, it was not difficult to get out and creep upward to the crest, some twelve feet higher.

PL. XII. GRAPHIC SECTION OF THE CARACOL OR ROUND TOWER.

This building consists of two turrets—a smaller superposed upon a larger. The lower is some 39 feet in diameter and 28 feet in height; the upper—in an advanced state of ruin—approximates 20 feet in diameter and 12 feet in height. Details of the restored profile are theoretic. This building is unique in its two annular galleries, its central column, its winding stairway and its nearly solid second story.

aa. Doorways in outer wall, facing east and west.
bb. Outer annular gallery, 5 feet wide.
c. Inner annular gallery, 5 feet wide.
d. Central column of masonry, 7 feet in diameter at base.
e. Entrance to winding stair.
f. Stone, supporting buttress walls (incorrectly connected in the drawing) which are intended to strengthen the arch.
g. Stone in place indicating verticality of the entablature.
h. Masonry at side of entrance to tunnel in upper turret.
i. Stone in place indicating verticality of upper entablature.
j. Section of tunnel passing through upper turret and probably connecting directly or indirectly with the upper opening of the winding stair.
k. Section of stair-passage near upper end.



GRAPHIC SECTION OF THE CARACOL OR ROUND TOWER, WITH HYPOTHETIC PROFILE.

Where the original termination of the passage was located cannot now be made out but I incline to the view that it was upon the terrace floor surrounding the upper turret, or possibly in a small gallery perforating the upper mass horizontally, as such a gallery was found passing through the turret from east to west. This passageway is one of the numerous unique features of the structure. It is thirty-six inches high, twenty-two inches wide and about ten feet long, and is faced with cut-stone as indicated in the section. What appears to be a door or window, seen on the west side of the summit, but not visible in the drawing, is only the opening of this passage finished with jambs and lintel of cut stone. It is probable that the other openings in the tottering summit-mass, seen from the southwest, are of like character, or otherwise only dummy doorways. This point could not be determined as the masonry was in such an unstable state that it was unsafe to venture farther along the steep margins of the tower.

So far as I could make out, there appears to be no room in the narrow, summit remnant of masonry for chambers. The east entrance to the passageway just referred to is broken down and the opening is seen in the crumbling slope. The floor is about four feet above the crest of the higher or outer arch and the opening in the ragged masonry slope is so situated with respect to the opening of the winding stairs as to give the impression that the two passages may have met somewhere in that part of the body of masonry now broken down. It is more likely, however, that both opened upon the upper surface of the great turret, the one horizontally and the other from below.

As I had no time to verify the orientations and measurements here given they may be somewhat inaccurate, but this will not seriously affect the general description.

The exterior conformation of this strange tower can be made out in part only. The lower wall is of ordinary masonry, finished in plaster and broken only by the four entrances. It rises nine or ten feet to the base of the formidable, five-membered molding, which projects two feet from the wall face and is five feet in width, being the only example of its kind in Yucatan. The upper margin is opposite the middle of the arch slope within, as seen in the section. The masonry at this level is four feet thick.

In studying this part of the building the very interesting question arose as to whether the exterior wall surface above this molding rose vertically or whether it sloped inward toward the upper turret. I had the good fortune to find one vertical stone, representing the first course above the molding, in place, and this I regard as conclusive

proof that the upper wall-zone was vertical. This conclusion is confirmed by the fact that in all cases in Yucatan and Chiapas, so far as I have observed, where the upper mural zone slopes, it includes with it in the slope not only all the courses above the medial moldings, but the medial moldings themselves, whereas in this case the moldings are vertical.

Examining the engraving, published by Stephens, of a similar, but single-walled round tower at Mayapan, an ancient Maya center, I find that the dome-like slope represented does not have the appearance of an original roof or inclined entablature surface, but rather that of the slope of the vault as it would appear if the outer masonry, occupying the space between the vault and the vertical façade, had slid off or gradually crumbled away, leaving the vault shell exposed.

A rise of seven or eight feet from the top of the medial molding, with three or four feet added for an upper molding and coping course, would bring the façade up to the base of the row of exterior openings seen in the upper pinnacle of the caracol ruin.

The upper part of the structure is in an advanced state of ruin, the apex of the outer arch is exposed or broken away nearly all around and the inner one is exposed in places, while the turret with its three window-like openings facing the south and west is a tottering crag. The restoration suggested in Fig. 2, though not far wrong in a general way, probably does not allow for a sufficient number of openings in the upper turret.

It is remarkable that this building should be without sculptured ornament, though there is a possibility that the upper wall-zone of both turrets has been embellished. An examination of the heaps of debris will determine this point.

Some authors are inclined to attribute the erection of this building to foreign influence, possibly to the worship of Quetzalcoatl, introduced by a colony of Aztecs, but so far as the design is concerned it is not Aztec, and the construction is purely Yucatec in every detail. It has, so far as I can discover, no striking analogies with Nahuatl work.

CHICHANCHOB OR RED HOUSE. About 400 feet northwest of the Caracol stands the so-called Red House, D in the panorama, the best preserved of the Chichen buildings. It is accurately oriented and fronts west so that blank walls only face the observer in my view. The supporting, vertical-faced terrace is ten or twelve feet high, sixty feet long from north to south and a little less in width. It is faced with ordinary masonry, large blocks forming the rounded corners and a heavy cornice projection or molding appearing at the top. The

stairway is on the west side, is twenty feet wide and has about sixteen hewn-stone steps.

The superstructure occupies a central position on the terrace, and is a little more than twenty by forty feet in horizontal extent, and is about twenty feet high to the roof. Additional height is given by a false front, five or six feet in height, decorated with open-work composite sculptures in which are included, in the principal line, three narrow, horizontally-elongated masks in the usual style. Viewed from the south, the end of a similar wall is seen on the roof midway on the south side. This wall probably takes the character of a roof-crest and may extend the full length of the building on the line of the medial wall.

Both zones of the wall proper show nothing but plain masonry and the moldings are simplified to two members each. The three rather high doorways are faced with hewn stone and open into a narrow vestibule extending the full length of the building. From this vestibule three other doorways enter as many rooms behind.

The interior surfaces were plastered and painted, but the building has been occupied a good deal in post-conquest times and it is possible that the dado in red (which may have given name to the house) and some of the borders in blue are of late date. A line of glyphs, reproduced by Stephens, extends the full length of the vestibule over the back doorways. The walls within and without have been repeatedly finished in plaster and color. Engravings of this building are given by Stephens and Charnay.

WESTERN PYRAMID-TEMPLE. Northwest, again, from the Red House, and some 200 feet distant is another small pyramid or terrace, E in the panorama, crowned with the ruins of a three-chambered temple facing south. The terrace is sixty-four feet square, according to Stephens, and the style of the building corresponds closely with other like structures in Chichen. It is now so fully overgrown and so badly ruined that I did not attempt to study it.

MIDDLE GROUP. Casting the eye to the right again, we observe near the center of the panoramic field the remains of another small pyramid-temple, G, and in front of it on the east and less than 100 feet away, is a low pile that represents an inferior structure of the same class. Between these ruins is a low mound twenty or thirty feet square and a few feet in height, and east of the small temple is another similar pile. These mounds contain tombs, as demonstrated by Mr.. Thompson, whose report on them will no doubt be replete with interest.

The principal pyramid of the group is about twenty-five feet high and perhaps sixty or seventy feet square at the base. The

sides are steep and the ascent is made by a partially preserved stairway on the east face. The balustrades represent huge serpents with incised, twined-fillet patterns on the flat upper surface, and fine heads with wide open mouths and protruding tongues extending forward on the ground. Near the top on the edge of a narrow, level space, are the remains of two square, serpent columns, the heads extending forward and connecting somewhat closely with the upper end of the balustrades. From this level space, probably occupied by a vestibule, eight or ten steps rise to the main level. Passing through a doorway, now nearly obliterated, we enter what was apparently a large apartment, where the remains of six square columns, doubtless roof supports, are still traceable. Although this temple was not as large as some others, it was, in the days of Chichen's prime, certainly a superior specimen of its class.

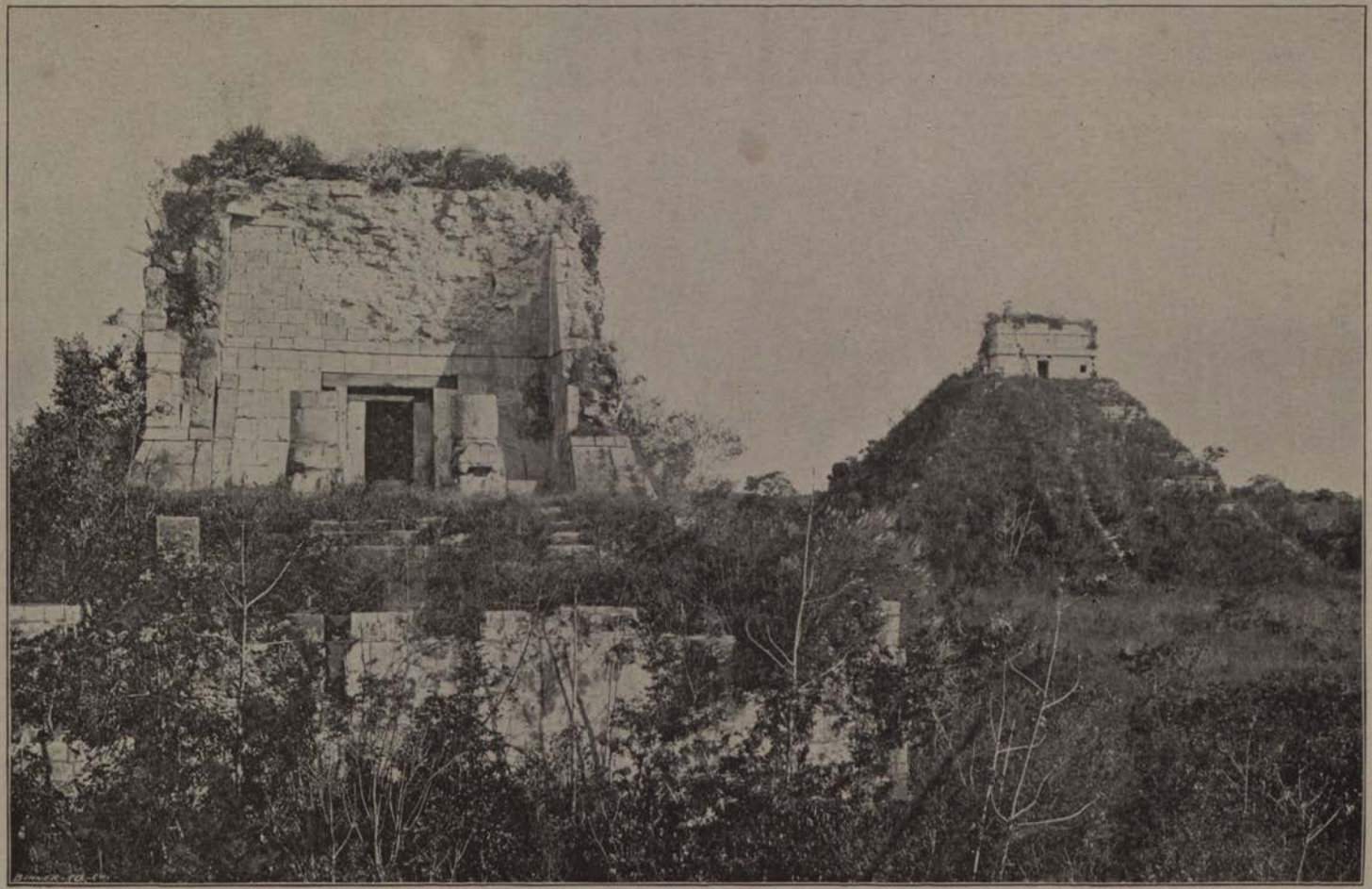
EL CASTILLO. We come now to the noblest monument of Chichen, the so-called Castillo or Castle, K, seen near the middle portion of the panorama rising grandly above the forest-covered plain. It is a pyramid-temple of the first order and bears testimony to the developing taste of the Itzas as well as to their capacity for designing and carrying out constructional enterprises of grand proportions. A distant view of this structure is given in Pl. XIII. It is perhaps as nearly a consistent unit of building, according to our estimate, as can be found in the Maya country, though there are still suggestions of lack of maturity and refinement. It embodies only two principal features, the square, terraced pyramid and the block-like superstructure. The pyramid is between seventy-five and eighty feet high and measures some 200 feet square at the base and about sixty feet square at the top. The stepped sides rise at an angle of fifty degrees. The stairways incline a few degrees less and hence project slightly beyond the pyramid at the base. The slopes rise in nine steps of eight or nine feet each, the terrace offsets being somewhat narrower. The rises incline inward a few degrees and are faced with well-hewn stone neatly laid in mortar and deeply paneled or coffered, thus diversifying an effect that would otherwise be extremely monotonous. The stairways, four in number*, assist also in breaking up the severity of the pyramidal mass. They are constructed of small blocks of roughly hewn stone, now much displaced in places.

The whole surface was probably evened up with plaster and finished in color. The temple fronts a few degrees east of north and

* I am not positive of the presence of a stairway on the east, as I failed to examine that side, but the probabilities are very strong that the four slopes of the pyramid are practically symmetrical.

PL. XIII. TEMPLE OF THE TIGERS AND EL CASTILLO.

This view is taken from the south end of the west wall of the gymnasium, looking east. In the foreground at the left is the solid mass of the east wall of the gymnasium supporting the ruined Temple of the Tigers. The plain hewn-stone wall is seen below, and rising from its margin to the temple level is the short stairway. The façade of the temple has disappeared save the lateral piers and the stumps of two great serpent columns which stood in the portal; the open mouths of the serpents, showing nostrils and bulbous fangs, face the observer. Back of the columns is the rear wall of the vestibule, with its characteristic masonry, and the doorway which leads to the pictured sanctuary. The end wall of the vestibule is seen at the right sloping to a point above, while one of the cap-stones of the vault is seen in place at the left. Beyond this temple at the right is the superb temple called El Castillo, 105 feet in height. The pyramid with its stairways, paneled terraces and neatly bound corners, is much obscured by vegetation. The west face of the temple, with its plain doorway and simple frieze and cornice, is clearly seen, but the north façade, in which occurs the wide main entrance and its fine serpent columns, is but imperfectly represented.



TEMPLE OF THE TIGERS AND EL CASTILLO.

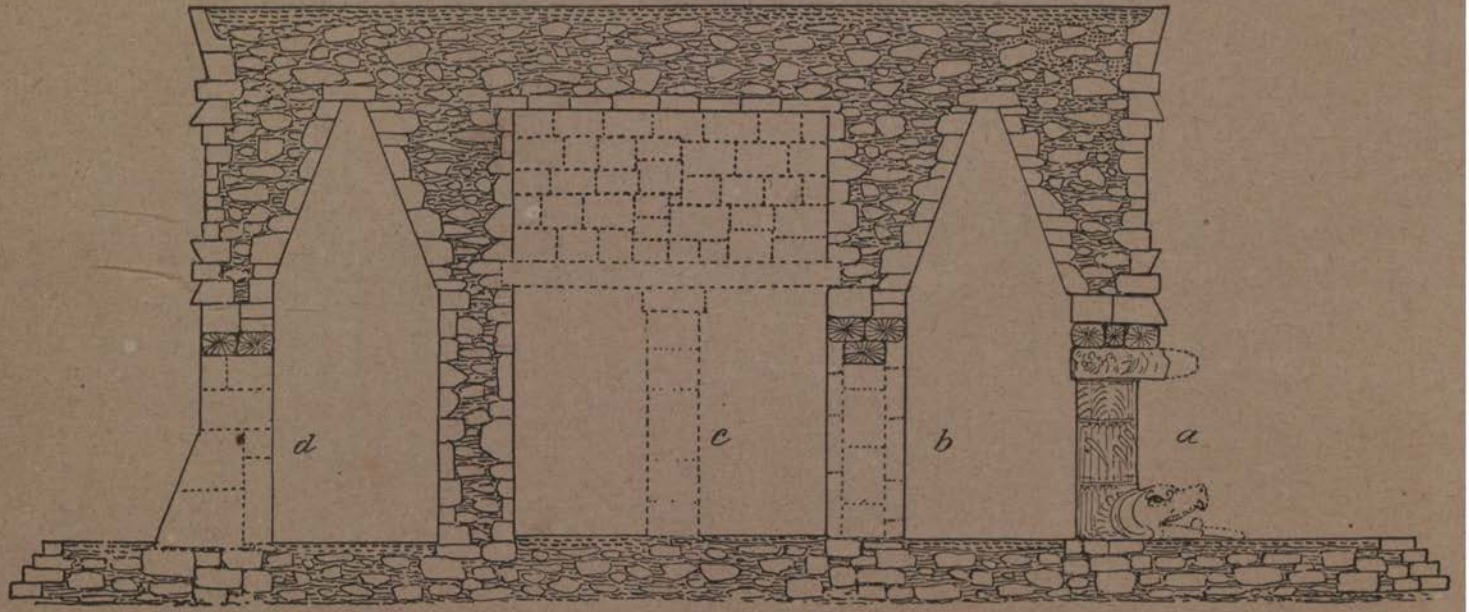


FIG. 35. SECTION OF THE TEMPLE CALLED EL CASTILLO, FROM NORTH TO SOUTH.

a. Serpent column at north or main entrance.
b. Vestibule with pilastered doorway leading to the sanctuary.
c. Sanctuary; square column, long wood beam and masonry of vault slope in dotted lines.
d. Outer gallery with doorway at left.

the stairway on that side is, according to Stephens, forty-four feet wide and contains ninety steps. The balustrades terminate below, as in other cases, in colossal serpents' heads. The serpent idea was carried out probably in the other stairways, and it is assumed also in the corners of the pyramid, on which may be seen, following in and out the nine terrace steps, the displaced stones that must have formed the colossal bodies. I counted ninety-two steps on the west side, and found the rises to average about eleven inches and the treads about ten inches. It is probable that there was a pretty close agreement in the principal features in all the flights, though the main front may have been favored with more elaborate sculptures.

The temple occupies the summit so completely that the esplanade is only about five feet wide on the west, south and east and from ten to twelve feet on the north front. The exterior wall measurements vary considerably with the level at which they are taken, as an incline at the base, four feet six inches high, with a batter of seventy-eight degrees, makes a difference of forty inches between the ground level measurement and that of the principal wall surfaces above. The walls are vertical, save the battered course referred to, and the height is twenty-five feet. A ground plan of the temple, with some details of chamber construction and small portions of the pyramid and its stairways, is given in Fig. 37.

The walls average a little less than three feet thick and are pierced by doorways on all four sides. The north entrance is twenty feet wide and is divided into three sections by two massive feathered-serpent columns. The other doors are plain and measure four feet six inches in width and six feet six inches in height. The main entrance leads into a vestibule extending the full length of the building east and west, and behind this a wide doorway gives entrance to a chamber, twelve feet seven inches wide by nineteen feet eight inches in length, in which stand two square columns supporting vault timbers. The other exterior doorways enter a corridor which extends along the south side and continues partially along the east and west sides.

It is desirable to describe this building somewhat in detail as it must, on account of its importance and excellent state of preservation, serve as a type of the Maya pyramid-temples. To avoid multiplication of words, however, I have prepared two sections which will at once convey a good notion of profiles and construction. The section from north to south, showing the façade on the right, is given in Fig. 35, and that from east to west is given in Fig. 36. In the first figure the profile of the north façade, partly restored, with its zapote lintels and rigid moldings, is seen at the right. The first

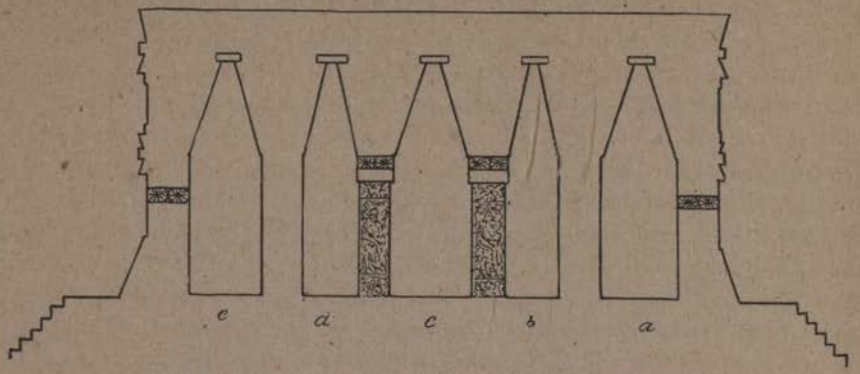


FIG. 36. SECTION OF EL CASTILLO FROM EAST TO WEST.

a and *e*. Outer gallery entered by east and west doorways.
b, *c*, *d*. Sanctuary with triple vault and ornamented columns.

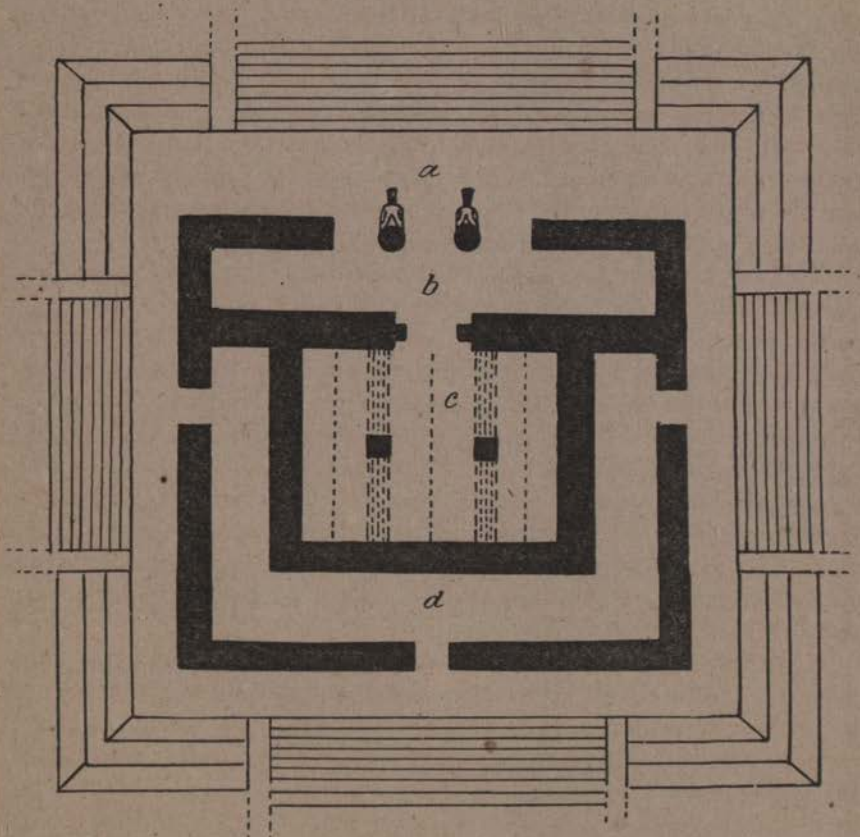


FIG. 37. PLAN OF TEMPLE AND UPPER PART OF PYRAMID OF EL CASTILLO.

a. North front with serpent columns in doorway.
b. Vestibule.
c. Sanctuary; dotted bands indicate position of wooden beams supporting vaults; dotted lines indicate apex of vaults.
d. Long gallery.

vault, *b*, is that of the vestibule, the second, *c*, that of the inner chamber, or sanctuary, cut lengthwise of the vault, and the vault *d*, is that of the south corridor. The inclined base of the exterior wall appears at the left. These arches all approximate eighteen feet in height leaving the roof mass above four, or possibly in places five feet thick. The other cross section shows the east arm of the long corridor vault at *a*, the triple vault of the inner chamber in the middle, *c*, and the west arm of the back corridor at *e*.

The façade is broken down over more than one-third of its area, mainly at the east end. The portal is entire, both columns, though much mutilated, being in place, and the three pairs of wooden lintels are intact, save the loss of one, or possibly two timbers from the east span. It is not likely that any novel or important architectural feature is lost, as the entablature decorations, which have entirely disappeared, probably duplicated those of the other façades. A good cut of the portal is given by Charnay, and I present another view in Pl. XIV.

The lower wall-zone is plain and is interrupted on the north by the front entrance, twenty feet wide and eight feet high, and on the south, east and west by doorways averaging about four feet six inches wide and seven feet six inches high. Fortunately nearly all the wooden lintels of this building are in place, but the fact that they are the weakest point in the construction is shown by the breaking out of considerable breaches above each of the doors where one or more beams have given way.

The upper wall-zone, separated from the lower by the heavy, rigid, triple-membered, medial molding, is treated in a very simple yet effective manner. It is only four feet ten inches wide, and contains three panels on each side, the outer ones being entirely plain, and the middle one of each set incloses a simply sculptured grotesque face, approximating the Palace masks, and doubtless referring to the same legendary conception or mythic personage or creature. The upper moldings are as usual, save that the coping member is exceptionally wide.

The inner chamber, usually referred to as the sanctuary, is remarkable for its triple vault and the symbolic relief sculpturings of its lintels, jambs, pilasters and square columns. These features have been illustrated by Stephens and Charnay, so that they need not be reviewed here in any considerable detail. This is the only perfectly preserved representative of its class in Chichen, but it is probably not as large or as elaborate as others of which we have distinct traces. Its ground plan and construction are well shown in the accompanying figures. Its most striking features are the vaults and

PL. XIV. MAIN PORTAL OF THE PYRAMID-TEMPLE CALLED EL CASTILLO.

At the right is seen the wall of cut stone with the inclined courses at the base; beyond is the portal, 20 feet wide by 8 feet high, divided by two massive feathered-serpent columns, the Indian boy leaning against the shaft of the nearer column. The serpent heads (base of column) are much battered, the jaw and cheek coil remaining in the farther example. The feather sculpture of the shaft is plainly seen and traces of the atlantean figures of the capital (tail of the serpent) are visible, though the outer ends are much mutilated. The wood lintels are well shown, the nearer set consisting of three timbers but slightly hewn; the middle set are well squared, and the farther are not seen, the inner one only being in place. The doorway leading to the sanctuary is seen behind. The façade moldings are partially in place above the lintels, but the end of the wall beyond is much broken down.

MAIN PORTAL, TEMPLE OF EL CASTILLO.

the two columns that support the pendant septæ of the triple soffit. The columns and the heavy timbers resting upon them are well shown by Stephens, and a reference to my sections will make the relation of these features to the vaults sufficiently clear.

The walls are of plain masonry, but the jambs and pilasters of the doorway, and the columns, are entirely covered with relief sculptures. The main subject employed is a human figure of full life-size, which is treated in a rather crude way, and occupies the middle portion of each of the narrow upright spaces, of which there are ten in the doorway and eight on the columns. This figure is elaborately costumed, but seems to have a priestly rather than a warlike character, judging by the action and the accompanying paraphernalia. One or two of the figures are remarkable from the fact that they have long beards; others have death's heads.

The narrow spaces over the heads and beneath the feet of the principal figures are filled, in the main, with dwarfish figures of whiskered Atlantes represented as supporting the parts above them. A few have death's heads, and some of the spaces are filled with grotesque masks or faces in relief, which would seem to embody the same conception as the great mosaic masks of the façades. All of these designs are repeated in several other sanctuaries.

BALL COURT OR GYMNASIUM. A little to the left of El Castillo, in the panorama, is the Tennis Court or Gymnasium. It is briefly described by Stephens and other explorers, and Mr. Thompson will no doubt work it out in all its interesting details, so that a sketch only need be presented here. This group consists of four structures independently placed, but practically inclosing an oblong rectangular space or court, which is about 450 feet long and 120 feet wide. The ground plan is indicated on the accompanying map, Pl. XVII.

The lateral structures—on the east and west sides—are primarily colossal walls 275 feet long, thirty-four feet thick and twenty-five feet in height. They are faced with hewn stone, and hold a significant relation with each other and with the court, as indicated by the placement of two great stone rings, set firmly in the walls by means of tenons at opposite points near the middle and at an elevation of some eighteen or twenty feet above the ground; the one on the east side only remains. These rings, as described by Stephens, are four feet in diameter and thirteen inches thick, and are pierced by an opening nineteen inches in diameter. It is believed that they served some function in connection with the game of ball, of which the Mayas, as well as other native tribes, were extremely fond. The annular faces, vertically placed, are decorated with intertwined serpents in low relief, the heads meeting above.

The western wall appears to be without decoration or other feature of particular interest, save the ring socket, and no stairway was observed. The eastern wall has associated with it the remains of two temples, which must have been among the most elaborate and interesting structures in Chichen. Near the south end the wall is enlarged on the east side into a terrace some forty feet square and four or five feet higher than the wall, and upon this stands a two-apartment temple, while a single-room temple was placed against the terrace at the east base. The section given in Fig. 38 and the plan, Fig. 39, will serve to show the peculiar relations of walls, temples and terrace, though the time given to the study of this ruin was too limited to permit a satisfactory analysis.

Although the lower temple is in an advanced state of ruin—the front, the roof and parts of the ends being destroyed, as indicated in the section—the back wall is preserved to the apex of the arch, and large parts of the end walls are in place. These walls, the remnants of square columns, and the antæ fronts, are covered with relief sculptures; those upon the walls represent, in the main, processions of elaborately costumed figures with associated symbolic devices, while those on the columns and jambs nearly duplicate the jamb and column sculptures of El Castillo. Nearly all the mural figures still retain distinct traces of the brilliant colors in which they were originally finished. They evidently represent the participants in a ceremony or dance, which was probably of a warlike nature. This latter suggestion is warranted by the carrying of weapons by the personages represented, by the association of the tiger and the shield with the decorations of the edifice, and by the battle-scene frescoes of the upper temple. Between the columns, as seen in the photograph reproduced in Pl. XV, is the figure of a tiger, rigid in pose, which may have had symbolic associations with the temple or may have served merely as a seat.

The ruin of the upper temple is a very considerable pile which retains large parts of the east, north and south walls; the front apartment or vestibule on the west is in about the same state of ruin as the single chamber of the lower temple. It stands upon a platform four or five feet higher than the gymnasium wall, and occupies nearly the entire space, save on the front which has a platform six or eight feet wide. It is probable that the roof of the lower temple was on a level with the top of the wall. No stairway has been located, though there are five or six steps leading down from the front of the temple to the edge of the wall facing the court. There may have been a flying stairway descending from this point connected with the top of the wall by wooden or stone beams, though so

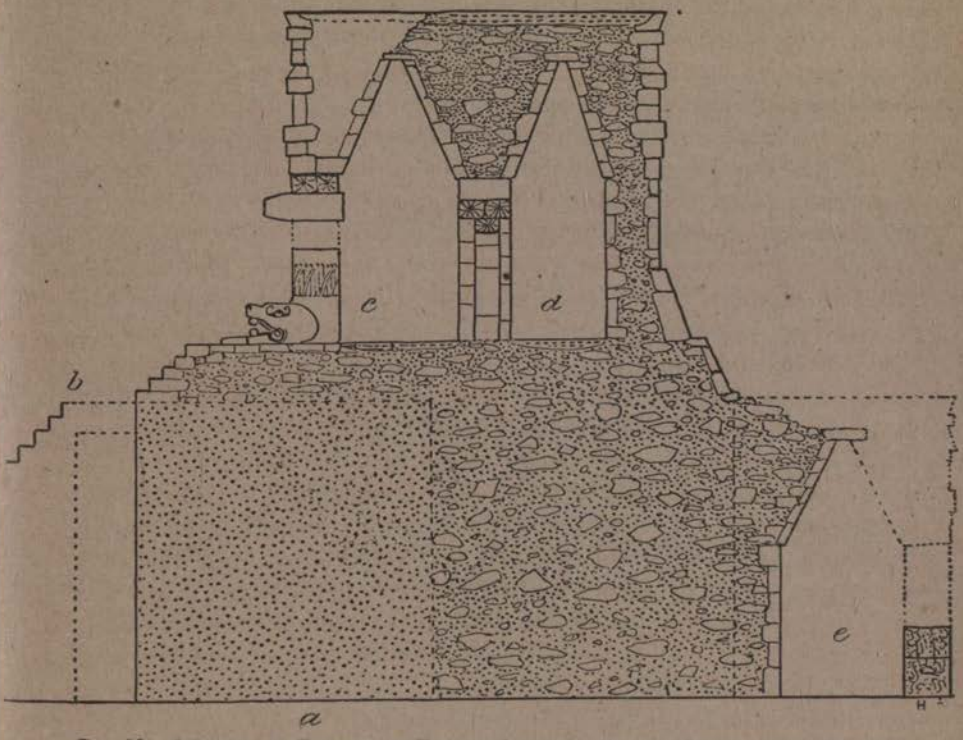


FIG. 38. SECTION OF TEMPLE OF TIGERS, SHOWING UNIQUE ENTABLATURE PROFILE.

Façade of upper structure and front face of vestibule vault above the middle of the column are restored. The lines should have been uniformly dotted. Façade of lower structure may not have occurred as here indicated, for there is a possibility that other chambers existed to the right of this.

a. Section of Gymnasium wall—dotted area.
b. Hypothetic continuation of stairway.
c. Serpent column and outer chamber or vestibule.
d. Sanctuary, entered by pilastered doorway with three wooden lintels.
e. Lower Temple, with sculptured columns and walls.

far as I could see, there are no traces of their insertion, and there is no debris below. It may be imagined that such a flight would have interfered with the use of the court as a playground. Of course a stairway could have approached by way of the wall from the east side, either north or south of the temple. The rear corners of the substructure sloped at a high angle, and were finished with rows of large stones rounded on the outer face and possibly intended to represent the bodies of serpents.

The façade of this building was some thirty-five feet long and twenty-two feet high, and is now represented by the bases of two huge feathered-serpent columns—which separated the wide portal into three parts—and remnants of the two lateral pillars or antæ fronts seen at the right and left, Pl. XIII. The columns correspond closely with those of El Castillo, but were larger and probably considerably taller. Both sets are referred to in the introductory pages and illustrated in the frontispiece. I have assumed, as indicated in the section, that the columns in this, as in other cases, supported zapote lintels. The façade rose above to the coping, and no doubt contained features corresponding closely with those of the other walls of the building.

We have here the first case observed in which the lower and upper wall spaces are not well differentiated, and the peculiar rigid moldings are absent. Beginning with the floor level, the wall rises five feet ten inches—in two or three courses of large stones—with a batter or incline of sixty degrees from the horizontal; the course above this, ten inches wide, slopes in at a still lower angle, Fig. 38. Above this is a paneled zone about four feet wide, the panels, two to a side, being shallow and peculiarly varied by facing certain minor planes at somewhat different angles. Above the panels come two slightly projecting courses, the upper decorated its entire length with chaste guilloche work in low relief. Next is a wider course set a little back and decorated with ornamented shield disks three to a side, alternating with well-sculptured tigers in low relief, arranged in four pairs. On the south side two pairs of the tigers at the right face to the right, and two at the left face to the left. All are in the act of walking. Apron-like pendants extend from the shield disks down over the subjacent courses. Next is a slightly projecting course corresponding to that below the tiger zone, and above this again is a narrower, inward-sloping course. Resting on this is another course set forward in the middle portion to form the base for a baluster-like ornament, some twenty feet long, occupying the middle part of the next course. This lower course and the outer ends of that above are embellished with handsome conventional reliefs. The same may be said of the next course which projects a little forward again forming

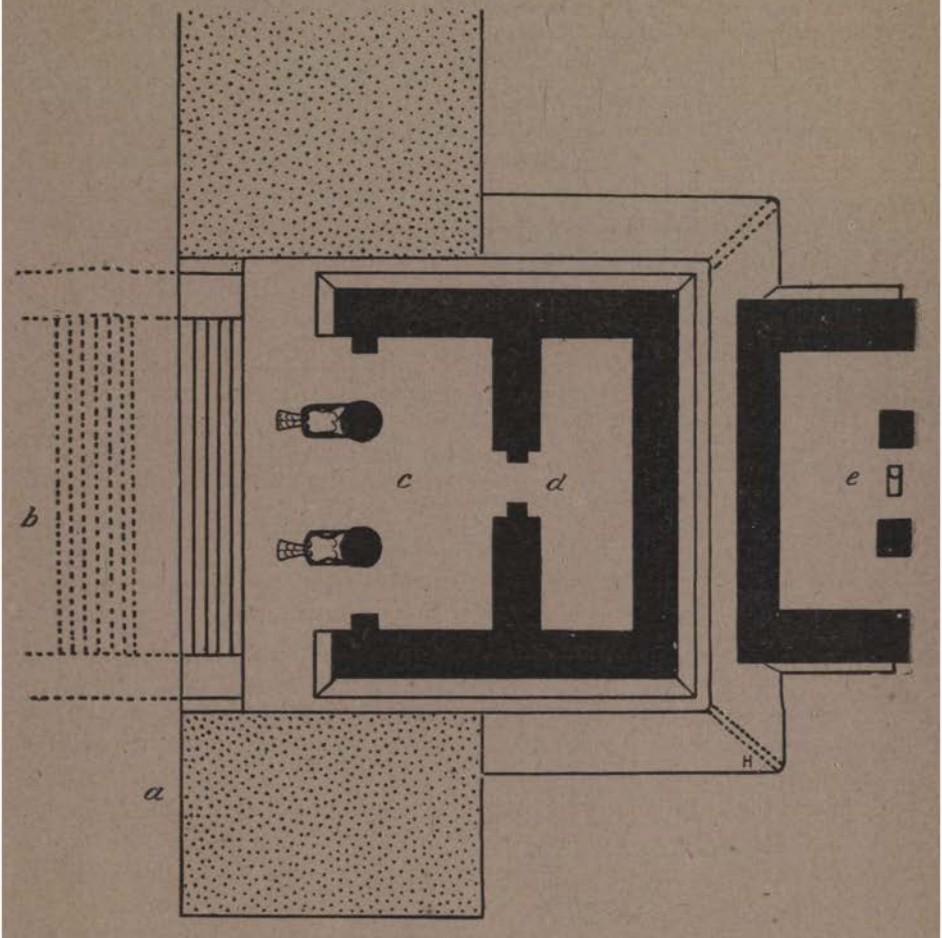


FIG. 39. PLAN OF TEMPLE OF TIGERS, GYMNASIUM GROUP.

a. South end of gymnasium wall.
b. Hypothetic position of stairway.
c. Columns and Vestibule of upper temple.
d. Sanctuary; walls, covered with paintings.
e. Lower temple, with square columns and sculptured tiger between.

a cap for the baluster panel, and supporting the coping course which is wide and projects forward as usual, Fig. 38.

The serpent columns occupying the western portal, still stand to the height of six or seven feet, and are elaborately sculptured to represent scales, feathers and other features. The eyeballs were formed of white sea-shell. The heads are massive and formed of a single stone, save the tongues, now lost, which were set into the end of the lower jaw by means of a tenon. The fangs in this case are large and bulbous. The end and back walls, and the expansive inner surface of the vestibule arch behind these columns, are well preserved, and faced with accurately dressed stones of rather large size. Most of the surface is now weathered quite clean, but originally it was painted and pictured, traces of the work remaining in several places.

Unlike the Castillo portal this entrance extends the full width of the building, save for the square pilasters set against the lateral walls near the front, and approximates the portico more closely than any other Maya propylæum. The appearance and relations of the antæ are sufficiently indicated in the ground plan and in plate XIII. The pilasters, which stand opposite the serpent columns, supported the outer ends of the wooden lintels, and like the jambs of the fine doorway leading to the back chamber, are handsomely sculptured with human figures in low relief. The lintel beams of the doorway, three in number, and set as indicated in the section, are covered with well executed glyphs. The back chamber is of the usual style and is noted for its elaborate mural paintings, described by Stephens and studied and copied by Thompson. The entire wall-space has been covered with these designs, but the remnants left are not sufficient to give a clear notion of the work. There are traces of borders of colored lines and bands, but the great spaces were filled in with pictorial subjects, hardly to be classed as decorations, as they were apparently without order or systematic arrangement.

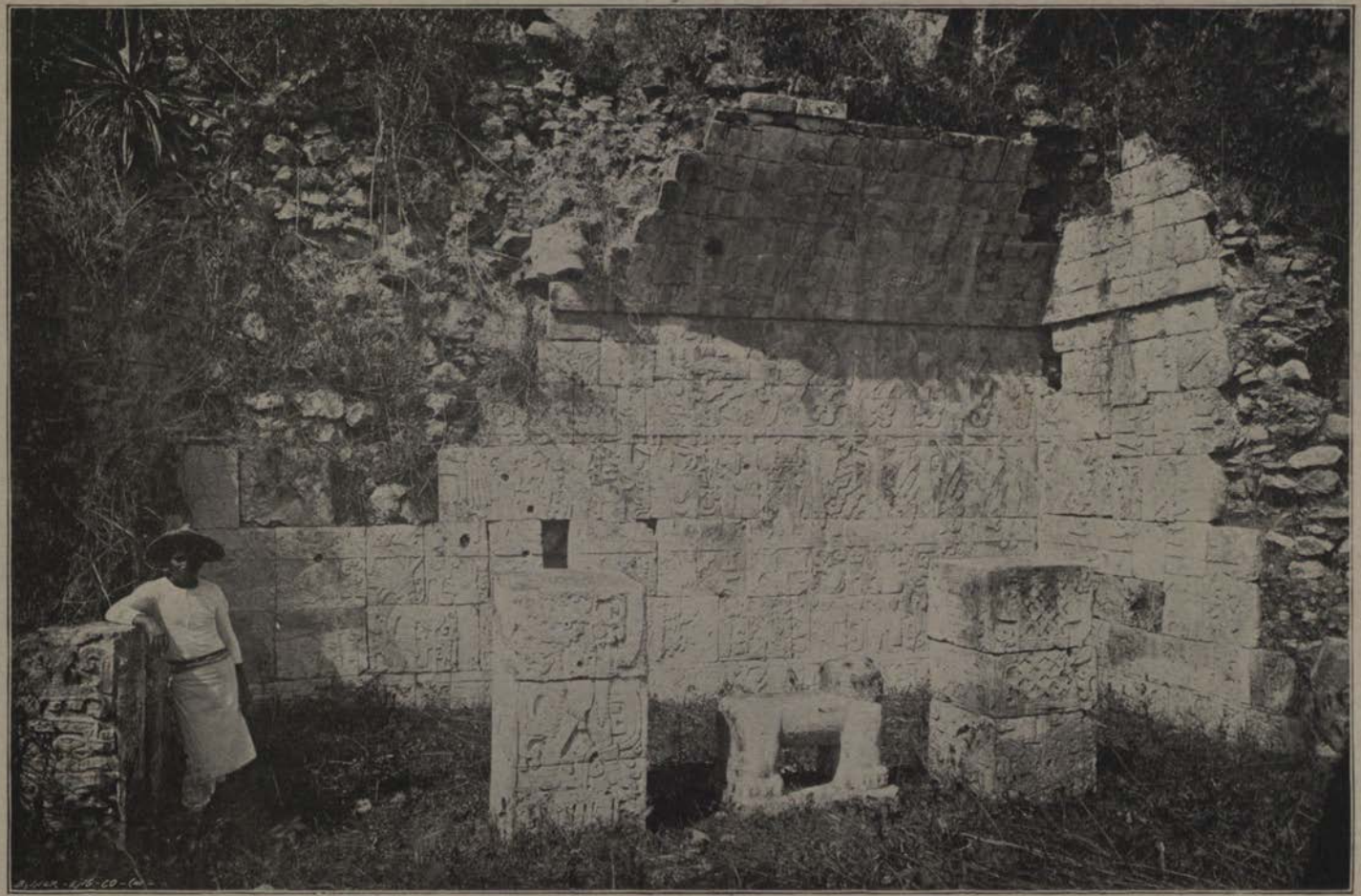
The only extended subject at all well preserved is a battle scene with numerous warriors engaged in combat. The figures are scattered over a large area in a somewhat hap-hazard way, and in the background is a village with buildings suggesting the columned temples, and with men and women variously engaged. The figures are drawn in clean, free outlines in a dark color, and filled in with flat colors which include white, black, yellow, blue, green, and red. A reddish brown was used as a flesh color, and the figures were drawn complete and nude before the costumes were added.

The action of the warriors is varied and strong, having a good deal of the fresh vigor of a sketch, but the work is hardly equal to the

PL. XV. SCULPTURED SANCTUARY OR CHAMBER, TEMPLE OF THE TIGERS.

This chamber, noted for its superb wall sculptures, is placed against the east base of the pyramid upon which rests the main Temple of the Tigers, south end of the eastern gymnasium wall. All that remains is a large part of the back wall, about half of the sloped soffit space above, the end wall at the right, part of the end wall at the left—against which the Indian boy leans—and the remnants of two square sculptured columns in front. It is generally assumed that this chamber stood alone and that the entire front was open save for the square columns, but possibly this is only the inner section of a triple-vaulted sanctuary, as in El Castillo, the front portion and the vestibule (or other entrance way) having been wholly destroyed.

The sculptures, which cover the walls, represent richly bedecked figures arranged as if to represent some ceremony or dance, and most of them still retain distinct traces of the brilliant colors with which they were originally embellished. The sculptures covering the columns are nearly identical with square-column decorations in other temples. The figure of a man occupied the front of the left hand column and that of a woman—as indicated by the plaid skirt—the right hand column. Between the columns stands the rather rudely sculptured and very formal figure of a tiger. This may not have been its original position. Length of the chamber, 22 feet; width, 10 feet; height, 15 feet.



SCULPTURED SANCTUARY, TEMPLE OF THE TIGERS.

best work of the codices, and perhaps hardly up to the grade of art to be expected of a people capable of designing and erecting the remarkable buildings of Chichen.

The small buildings facing the court at the north and south ends call for a mere mention only. That on the north is a small pyramid-temple, having a single chamber and round columns now in a ruined state. That at the south end was much larger, but is in a very advanced state of demolition. Both are shown in the panorama.

TEMPLE OF THE CONES. A few rods directly north of El Castillo, and imperfectly shown in the panorama, is a pyramid-temple of considerable importance, but one to which I was unable to give particular attention. It is, however, so completely ruined that little can be determined with respect to its character without extensive excavation. It has been embellished with a frieze (probably) of diminutive cone-shaped columns. Associated with it are several pieces of sculpture, including handsome slabs with subjects in bas relief, and a "Chac-mool" of the well-known Le Plongeon type.

GROUP OF THE COLUMNS. To the right of El Castillo in the panorama is one of the most important clusters of remains in Chichen. It has been but little explored and remains a treasury of interesting data for some future explorer. A great irregular squarish space, some 500 or 600 feet in extent, is bordered by the ruins of pyramids and buildings of greatly varied characters. At the north are two considerable pyramids, at the south are two or three more and on the east are several others involved with terraces and coalescent piles of unusual conformation. The largest pyramid stands on the outside of the northwest corner of the inclosure, and is nearly 100 feet square and some fifty feet high. It probably supported a temple and was faced with hewn stone, but is now hardly more than a mound of broken-down masonry.

TEMPLE OF THE TABLES. Beyond the mound just referred to is a smaller pile about twenty-five feet high, upon which are now exposed, through the labors of some enterprising explorer, the remains of a superb temple, hardly surpassed in interest by any other in the city. The main façade seems to have been to the west and is represented now by its stairway, its fallen serpent columns and sculptured lateral walls, not yet fully freed from the mass of debris. The appearance of the fallen column on the north is roughly indicated in the accompanying sketch, *Fig.* 40, which shows the broken head nearly five feet long, the protruding sculptured tongue, two feet long, a round shaft section twenty-three inches in diameter, and the upper section of the shaft terminating in the serpent's tail which is five feet long, and turned outward forming the capital. This latter

section of the column is peculiar in being square. The whole height of the column, if the parts really belong together, was ten or eleven feet.

Behind the columns was a vestibule, probably of the usual type, from which a doorway, with square sculptured jamb-piers, opens through into a rear apartment of imperfectly defined characters, but exhibiting features of unusual interest. The floor space is about fifteen by thirty-six feet in extent, the inner wall, and very small portions of what may have been end walls, remain. Ranged along the middle of the space from north to south are the remains of four square columns, Pl. XVI, built of large stones and handsomely embellished over the entire surface with figures and devices in low relief, such as are seen in El Castillo and elsewhere. They are nearly nine feet high and measure twenty-three inches square; they undoubtedly supported zapote beams and the usual arched ceilings. This chamber was probably the sanctuary, as it corresponds to this feature in El Castillo and other temples.

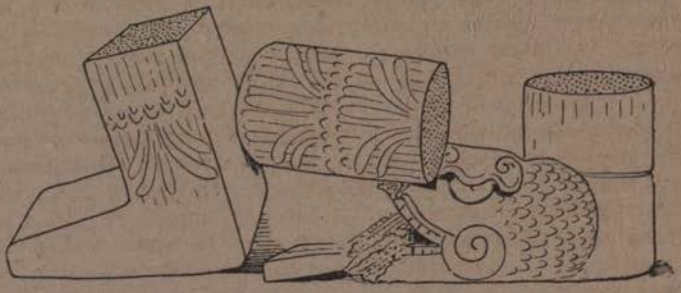


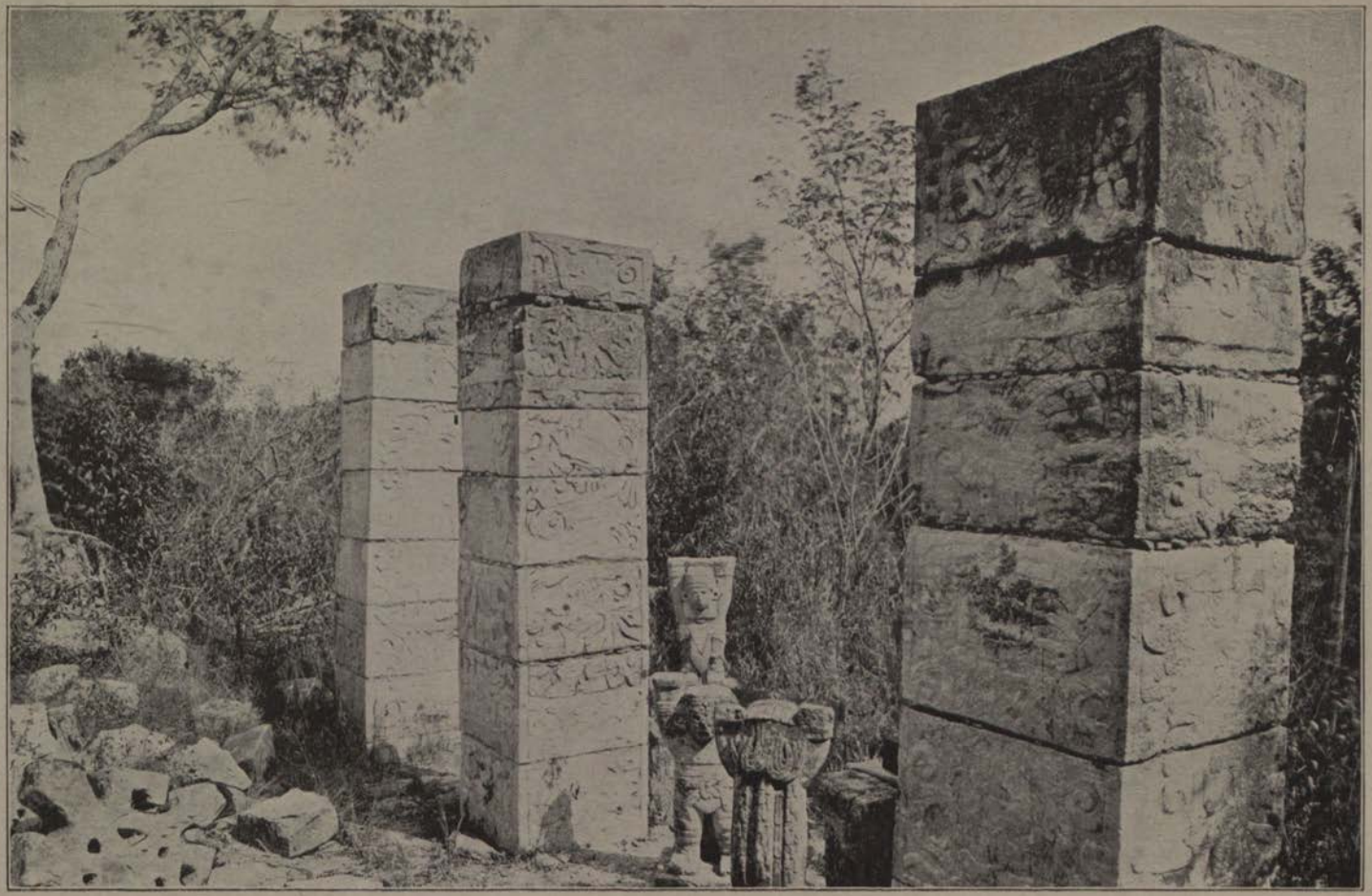
FIG. 40. SKETCH OF FEATHERED-SERPENT COLUMN

Façade of Temple of the Tables; ornamentation imperfectly recorded.

The most extraordinary feature, however, connected with this temple is a series of accurately cut limestone tablets held up by human figures of caryatid-atlantean type, thirty inches high, and ranged along the outer edge of the floor space on the margin of the terrace. The tablets are of varying dimensions, averaging perhaps three feet square and five or six inches thick. They appear to have been placed to form a continuous table the entire length of the building, each slab having been supported by two of the figures, as shown in Fig. 41. These slabs are wonderfully resonant, and when struck lightly with a hammer or stone, give out tones closely resembling those of a deeply resonant bell, and the echoes awakened in the silent forest are exceedingly impressive. The dwarfish figures are well sculptured in elaborate costumes, and stand with both hands aloft, giving a broad surface for supporting the slabs. All have been taste-

PL. XVI. SQUARE COLUMNS, TEMPLE OF THE TABLES.

Four of these handsomely sculptured, square columns are ranged across the eastern platform of the pyramid, and, judging by analogy, were employed to support the vault timbers of the sanctuary. They are nearly identical in their sculptures with square columns in the sanctuary of El Castillo, and correspond closely with the square, sanctuary columns of several other temples. At the top are bearded, atlantean figures in the position of supporting the entablature or beams; at the base are similar sculptures, not clearly made out; and occupying the middle spaces, one to each side, are life sized, elaborately costumed figures of men in low relief. The height is 9 feet and the horizontal measurement about 25 inches. With the columns are shown several of the pigmy atlantean figures used as supports for stone tables ranged around the margin of the terrace, as if originally placed against the back wall of the sanctuary. They are now much displaced, and in the view one is so placed as to show the graceful drapery of the back.



SQUARE COLUMNS, TEMPLE OF THE TABLES.

fully finished in bright colors. Two or three sets of similar figures are found in the adjoining ruins.

QUADRANGLE OF THE COLUMNS. In the panoramic view the great inclosure of the columns is too distant to be indicated clearly. Beginning at the northwest corner, one range of buildings, represented by a rough surfaced flattish ridge some sixty feet wide and perhaps 400 feet long, extends to the eastward from the large pyramid. It is characterized by its multitude of short columns, square towards the west end, where there was apparently a temple of usual type, and round to the east, where they stand in close order over a large part of the ruin. There can be little doubt that these columns belonged to an extensive building and were connected by wooden beams which extended from column to column over the entire

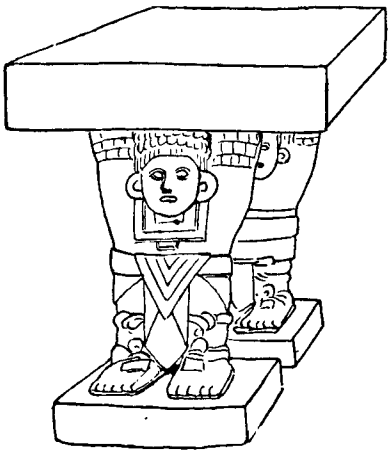


FIG. 41. STONE TABLET SUPPORTED BY TWO ATLANTEAN FIGURES.
Whole height 40 inches.

area supporting the roof timbers, or masonry, and affording a covered space of large extent and unique appearance. It would seem from some slight excavations made in the mass, that a considerable range of vaulted apartments is buried beneath the debris.

North of this pile are ridges of debris of unknown extent buried in deep forest, and toward the east the line is connected by a low, narrow ridge, also showing columns, with a ruined mass upwards of 100 feet long, forty feet wide and twenty-five feet high, which extends to the southward. From the center of the latter there branches off to the east a low mass approximating sixty feet wide and a hundred feet long, covered with remnants of large square columns; and from the south end another range with columns extends to the east and connects with still another north and south range

100 feet or more in length. The latter joins the north slope of a pyramid upon which formerly stood a typical temple of large size with square columns, remnants of which remain, while numerous interesting caryatid-atlantean figures occur in the debris. This pyramid is perhaps sixty by 100 feet in horizontal extent and forty-five or fifty feet in height; other piles of inferior dimensions occur to the south and east.

The ranges of ruins on the west and south side of this great enclosure are of less importance and do not require description here. They terminate in two or three small mounds at the southwest angle, from one of which stone is being taken for the burning of lime.

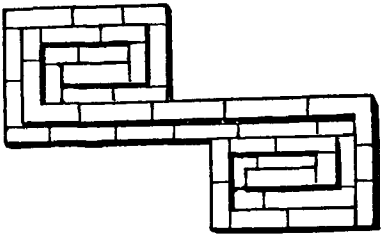
More or less definite reference has now been made to something like thirty ruined structures, over half of which are of the pyramid-temple type. If these were really temples, and not merely the dwellings of the more ambitious citizens or great caciques, we have a striking illustration of the importance of sacerdotal customs among the Mayas, and a clear indication of the great importance and extent of Chichen in the days of its prosperity.

CENOTES. It remains to point out in the panorama the two remaining features of importance, the Cenote Grande near the center of the picture, M, and the Sacred Cenote, N, away off towards the horizon beyond the Gymnasium court. The former was probably a chief source of the supply of water that made the development of Chichen possible, and the imagination is wont to picture the trains of tireless carriers moving, almost without ceasing, up and down the steep pathway and back and forth in the city. This great well is some seventy feet deep and averages perhaps 150 feet in diameter. It had its origin, no doubt, in the caving in of the roof of a subterranean waterway, the orifice enlarging by breaking down at the sides until the walls reached the vertical and in places passed beyond it. Progress was made, not so much by the falling in of undermined masses as by the mere crumbling of the surface, particle after particle falling from the wall to be dissolved or carried away. As the limestones are massively bedded and quite homogeneous in texture, the surfaces were probably always nearly as even and smooth as they appear today. Disintegration took place somewhat equally all around, giving rise to the circular form which is so pronounced that many people regard the cenotes as works of art. The pool which rests calmly at the bottom of the pit is shallow at the side next the steep pathway where the walls are most broken down, but in the center and against the perpendicular wall is of unknown depth. The water is at present sufficiently pure to serve for drinking and culinary purposes; but its taste is naturally affected by the vast accumulation of vegetable

matter swept into the gaping orifice each year. No current is perceptible and if there is any connection with a subterranean stream it is by seepage merely, the errosive agencies not being sufficiently active to clear away the accumulation of debris descending from above.

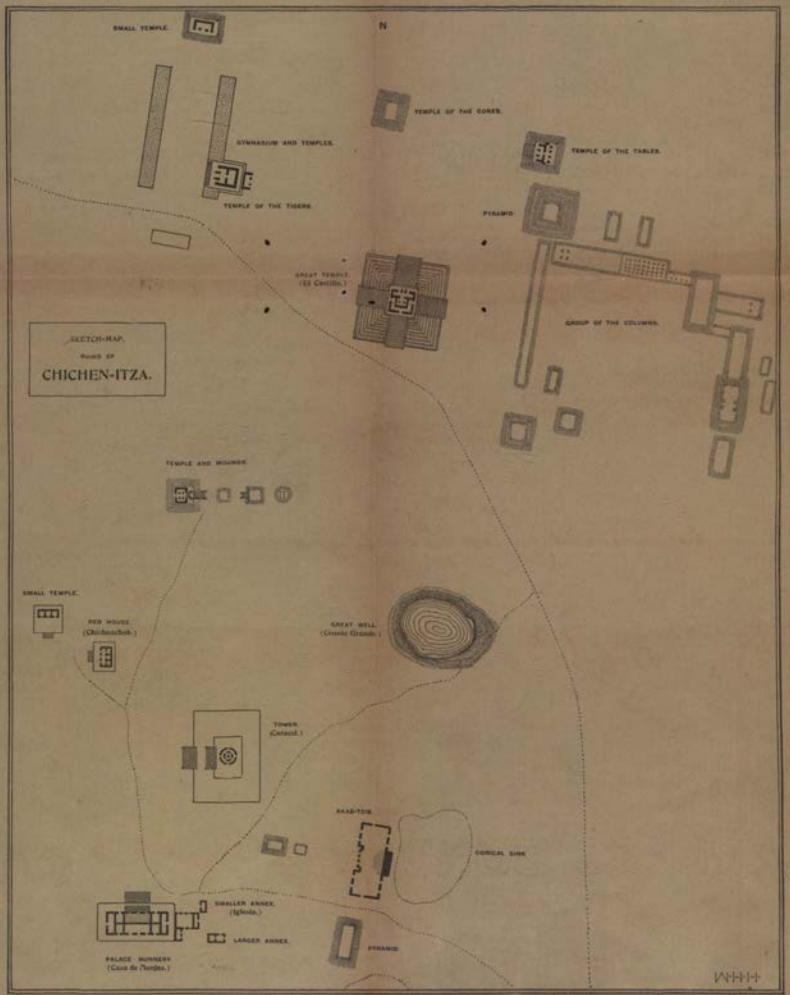
The Sacred Cenote is larger, and more symmetrical than the other, and, occurring in the midst of the somber forest, is a most impressive and awe-inspiring spectacle. Its charm is enhanced by the weird stories of human sacrifice associated correctly or incorrectly with its history. The walls are nearly circular and approach the perpendicular closely all around. They are diversified only by the encircling ribs and pitted grooves produced by the uneven weathering of the massive, horizontally-bedded limestones. The water has a light coffee color and looks very impure. It is shallow on one side and of unknown depth on the other. A small tomb-like ruin is perched upon the brink. It is conjectured that this structure had something to do with the ceremonies attending the casting of victims and treasure into the terrible pool.

There has been some talk of exploring the accumulations forming the bottom of this cenote with the expectation of securing works of art or other treasures, but the task is a most formidable one and will require the erection of strong windlasses and efficient dredging apparatus. It is doubtful if promised results warrant the outlay necessary for carrying out the work in a thorough manner.



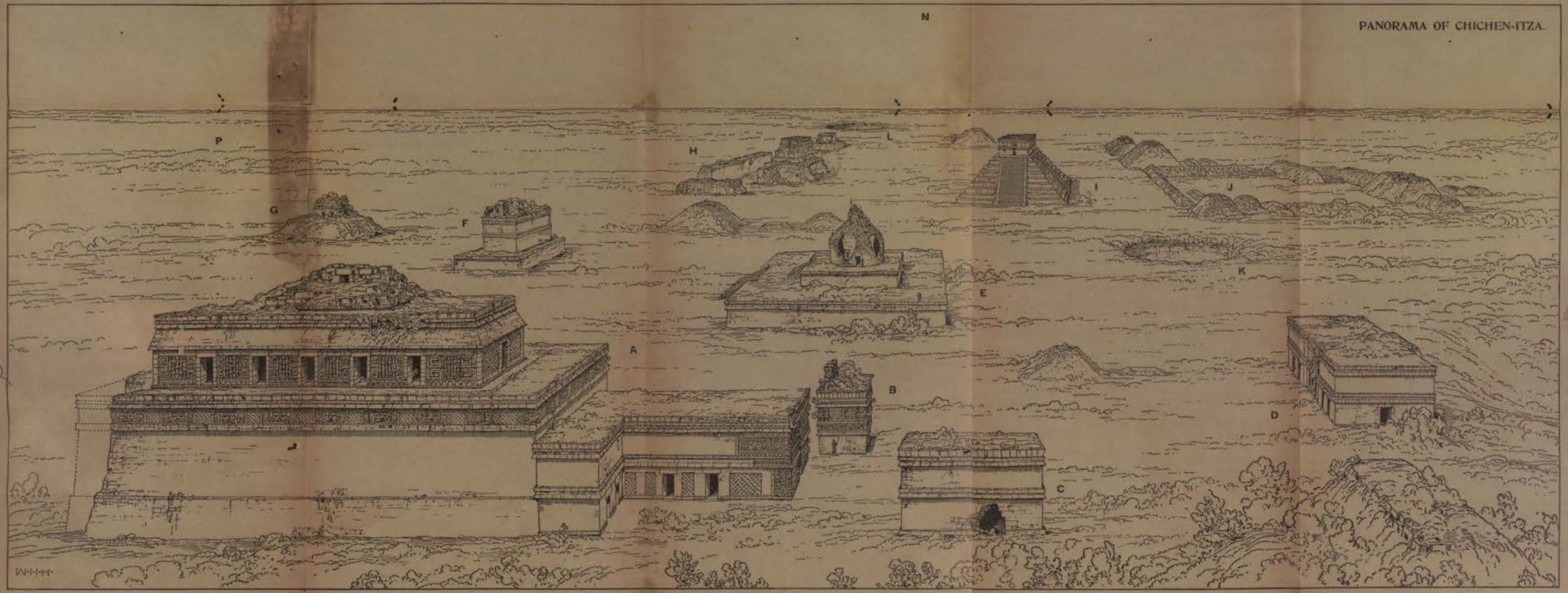
MOSAIC FRET, UXMAL.
Length, eight feet.

END OF PART I.



Point of View of Panorama.

PANORAMA OF CHICHEN-ITZA.



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